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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Fourth Annual Meeting, Southwestern Gas, Electric and Street Railway Association.

SOUTHWESTERN GAS, ELECTRIC AND STREET RAILWAY ASSOCIATION,
OFFICE OF THE SECRETARY,
WACO, TEX., Feb. 8th, 1902.

The Fourth Annual Meeting of the Southwestern Gas, Electric and Street Railway Association will be held in San Antonio, Tex., on the 18th to the 21st of April, 1902. As the membership is alive with interest, both on account of the place selected to meet and the good results to be obtained, a successful meeting is therefore assured. The headquarters and programme in detail will be announced later.

T. H. STUART, Sec'y.

[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

WESTERN GAS ASSOCIATION,
OFFICE OF WRINKLE DEPARTMENT.
BELLEVILLE, ILLS., February 12th, 1902.

This department is now open and ready for contributions, which will be presented at the Twenty-fifth Annual Meeting to be held next May. The active co-operation of all members and friends is earnestly solicited. Please forward contributions to the Editor before April 15th.

W. E. STEINWEDELL, Editor.

BRIEFLY TOLD.

THE "MAXIMUM GAS RATE," SAN FRANCISCO, CAL.—"A. L. V.," writing to the JOURNAL under date of the 27th ult., forwards the following regarding the opinion prepared by the City Attorney, Mr. Franklin K. Lane, respecting certain questions put to him by the Board of Supervisors, of San Francisco, Cal., as to "maximum rates" that may be exacted for public lighting in that city. The full text of the replies is appended:

"Gentlemen: I am asked in resolution 2332 to give an opinion as to the meaning of Section 6, chapter III., article II., of the charter, as to whether the said city and county of San Francisco can enter into a contract with any gas, electric light or other illuminating company at any higher rate than the minimum rate charged by such gas, electric light or other illuminating company to any other consumer; also to construe specifically the word 'charged' used in that section; that is, whether it means established by the Board of Supervisors or made by the company; also as to the time to which said word 'charged' refers. The section above referred to reads as follows: 'No contract for lighting streets, public buildings, places or offices shall be made for a longer period than one year; nor shall any contract to pay for gas, electric or other illuminating material at a higher rate than the minimum price charged to any other consumer be valid.' The purpose of this provision is clear; it is to insure the city against paying more for gas or electric light service than the most favored private consumers have to pay for such service. I find no indication in its language that the word 'charge' has any reference to the rates fixed by the Board of Supervisors under authority of the constitution. The Board does not, as a matter of fact, or of law, fix a minimum price, but does fix a maximum rate. Therefore, it does not appear to me that there is any possible foundation for the contention that the Board of Supervisors has power to make a contract with an illuminating company for lighting service at the maximum rate, when other consumers obtain gas or electric light at a less rate. The city is not engaged in the business of furnishing gas or electric light, and hence does not 'charge' any price for gas or electric light. It is the company or companies which render the service who fix therefor a selling price at or below the maximum rate established by the city, and charge such price to the consumers. There is no time expressly fixed in the charter as that at which the city shall take cognizance of the rates charged to other consumers and be guided thereby in making its contract; but it seems to me the reasonable con-

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APR 8 1902
SMITHSONIAN DEPOSIT.

struction that the minimum price charged at the time of making the contract should govern."

NOTES.—Mr. George W. Graves has secured a sales' option on the plant and franchises of the Middletown (Pa.) Gas Company.——On June 1st the selling rate at Stoneham, Mass., is to be reduced to $1.50 per 1,000 cubic feet.——Silas Dagget and H. L. Cromwell propose to establish a central station acetylene lighting service for Martha's Vineyard, Mass.

Obituary Note.—Mr. Bryan Donkin.

The *Journal of Gas Lighting* reports the sudden death, from heart failure, at Brussels, Belgium, on Tuesday, March 4th, of Mr. Bryan Donkin, whose fame as an engineer is securely established the world over. Continuing, the *Journal* made the following mention respecting Mr. Donkin's active, successful life: The deceased gentleman was in the Belgian capital fulfilling a business engagement, and was fully occupied on Monday. On returning to the Grand Hotel, where he was staying, he complained to a waiter of feeling unwell, and asked him to send for a doctor. Mr. Donkin went to his room; but before medical assistance arrived he had passed away. We learn from *Engineering*, to which we are indebted for the following particulars of Mr. Donkin's work, that he had previously complained of heart trouble, for which he recently consulted his cousin, Dr. Horatio Bryan Donkin, who, while counselling some diminution in his patient's characteristic ardor, did not think the case one for advising complete cessation of work.

Mr. Donkin was born in 1835, and was consequently in his 67th year. He was the eldest son of a well-known engineer, Mr. John Donkin, and the grandson of a still more brilliant scientist—Mr. Bryan Donkin, who in the year 1803 founded the well-known works in Bermondsey. He was educated at the University College and at the Ecole Centrale des Arts et Métiers in Paris, and served an apprenticeship under his uncle at the above named works. He became a partner in 1868; and when, the following year, the firm was converted into a limited liability company, he was made Chairman, and continued to hold this position after its amalgamation with Messrs. Clench and Company, of Chesterfield, in 1900. He then, however, relinquished active participation in the management of the business. In the early seventies, Mr. Donkin turned his attention to the scientific side of engine design; and his investigations in connection therewith led to many improvements being effected in details. One department in which he did specially valuable service had reference to steam condensation in cylinders, and its reduction by jacketing and superheating, as well as to the investigation of the laws governing transmission of heat through cylinder walls.

Early in the nineties, Mr. Donkin directed his attention to the subject of internal combustion motors, and found in them also a subject congenial to his inquiring disposition and facile pen. In 1894, he read a paper before the Institution of Gas Engineers on "The Comparative Merits of Steam and Gas Motors;" and in the same year he prepared for the Manchester Association of Engineers a review of the scientific work of Hirn, which is as lucid as it is instructive and sympathetic. A year later, Messrs. Griffin published the first edition of his standard work on "The Gas Engine," now in its third edition. He also published, through this firm, a book on the steam boiler, with details as to the heat value of fuel, analyses of gas, evaporation, etc.; and he translated Diesel's work on "The Theory and Construction of the Rational Heat Motor." At the same time, he was himself engaged in original research work in connection with internal combustion engines; and he was a judge for the Royal Agricultural Society and at other competitions. He introduced at his works the Perret system of forced draught, the manufacture of which apparatus was taken up by the firm and successfuly developed.

There are few volumes of the "Transactions" of the leading technical institutions without some contribution from Mr. Donkin, for he was as willing as he was able, from his extensive practice, to add to the profit derivable from any discussion. As far as the *Journal* is concerned, the name of Donkin has been associated with it, in connection with the firm of which the deceased gentleman was till recently the head, for more than half a century; while he himself was a valued contributor to its columns. Within the past few years, communications by him have appeared on "The Number, Use and Application of Gas Engines," and "The Life Work of Edouard Delamare-Debouteville," as well as articles not bearing his name, one of which has been already mentioned.

Mr. Donkin was a Vice-President of the Institution of Mechanical Engineers, a Watt Medallist and Telford and Manby premium and prizeman of the Institution of Civil Engineers, a member of the Royal Institution, of the Société Industrielle de Mulhouse, of the Verein Deutscher Ingénieure, and of the American Society of Mechanical Engineers. He was a Director of the Crystal Palace District Gas Company, having been elected last August to fill the vacancy on the Board caused by the death of Mr. Frederic Lane Linging; and our readers may possibly remember that at the last meeting of the Company, on the 14th ult., the new Director, in acknowledging his re-election, made a few interesting remarks on the subject of power gas and gas engines, in which direction he thought that there was a considerable future for gas companies.

PROCEEDINGS, EIGHTEENTH ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

HELD IN COLUMBUS, O., MARCH 19 AND 20, 1902.

FIRST DAY, MARCH 19, MORNING SESSION.

The Ohio Gas Light Association convened in 18th annual meeting at Convention Hall, Great Southern Hotel, Columbus, O., March 19, 1902, at 9.30 A.M. Mr. Henry L. Doherty, of New York City, presided. Mr. T. C. Jones, of Delaware, O., acted as Secretary and Treasurer.

ROLL CALL.

Upon roll call the following members reported their attendance:

Abbott, E. D.
Alcott, F. L.
Andrews, C. W.
Arthur, C. L.
Barnes, G. W.
Baxter, I. C.
Beam, F. L.
Bender, W. E.
Blinn, A. C.
Boal, S.
Booth, M.
Boyle, W. C.
Brooks, H. S.
Canterbury, J. P.
Carpenter, H. A.
Clapp, G. N.
Clansen, W. F.
Cline, J. W. R.
Collins, D. J.
Connelly, J. S.
Coombs, M.
Coombs, F. S.
Corbus, F. G.
Cressler, A. D.
Critchfield, C. V.
Davidson, J.
Dawes, B. G.
Daugherty, G.
Dell, J.
Dickey, R. R.
Dixon, W. R.
Doherty, H. L.
Dole, S. M.
Drouillard, G. L.
Dunbar, J. W.
Eaton, A. B.
Eysenbach, E. E.
Foster, B. P.
Franklin, J.
Field, F. H.
Gardner, W. H.
Garrison, F. L.
Gassett, A. L.
Gillette, M. M.
Gregory, J. M.
Guldlin, O. N.
Gwynn, J. W.
Hamlick, L. C.
Harbine, J. H.
Harper, H. D.
Harris, J. A.
Hedges, J. S.
Hedges, W. C.
Henderson, E. H.
Hess, F. H.
Holmes, A. G.
Johnson, E. D.
Johnston, J. O.
Jones, H.
Jones, T. C.
Kahn, L.
Kauke, J. H.
Kirk, D. B.
Knight, W. H.
Landon, H. McK.
Lathrop, A. P.
Leakey, N. G.
Light, G.
Lloyd, E. F.
Low, D. W.
Lynn, J. T.
Lynn, J. R.
McCormack, E. T.
McDonald, D.
McElroy, B. L.
McIlhenny, J. D.
McLain, C. M.
McMillan, J.
Mancourt, E. M.
Mansur, J. H.
Many, F. B.
Marks, W. D.
Mason, C. T.
Mason, J. T.
Matt, E.
Maxon, J. H.
Mayers, J. A.
Malone, M. E.
Miller, W. H.
Morreau, A.
Moses, F. D.
Mulholland, S. E.
Neeley, J. D. S.
Olds, H. L.
Osborn, H. H.
Parker, G. W.
Pattrell, C. B.
Perkins, B. W.
Perry, A. T.
Philipp, E. B.
Printz, C. H.
Printz, E.
Ritter, C. S.
Russell, D. R.
Sapp, D. E.
Schwarm, C. A.
Sharp, W. G.
Strain, G. A.
Shattuck, J. D.
Schniewind, Dr. F.
Spinning, D. C.
Stacey, F. A.
Stacey, J. E.
Steenbergen, C. L.
Stevens, J. G.
Stone, F. W.
Swartz, H.
Stuckenborg, J. F.
Tayler, G. H.
Thompson, H. G.
Turney, H. D.
Walters, J. U.
Wells, L. W.
Whysall, G.
Wickham, L.
Witherden, G. M.
Wones, W. R.
Woolen, A. L.
Young, P.
York, G. W.

The President having called the convention to order, the reading of the minutes of the last meeting was dispensed with.

REPORT OF THE EXECUTIVE COMMITTEE.

The Secretary read the following report from the Executive Committee:

To the Members, the Ohio Gas Light Association—Gentlemen: We, your Executive Committee, make the following recommendations:

First.—That Isaac C. Baxter, J. H. Maxon and Chas. S. Ritter be appointed a Nominating Committee.

Second.—That John R. Lynn, A. J. Stacey and D. R. Warmington be appointed a Committee on Memorials.

Third.—That John Franklin, Geo. Whysall and F. R. Persons be appointed a Committee on Place of Next Meeting.

Fourth.—That Joseph Gwynn, James Salter, W. S. Bowen, Geo. H. Christian and R. A. Dittman be dropped from membership for non-payment of dues.

Fifth.—That Chas. H. Welsh, Emil C. Schmidt, Neil B. Mallon, W. R. Dixon, Graham McFarland, D. C. Spinning and George B. Edgar be released from membership at their own request.

Sixth.—That the following be elected to active membership:

A. C. Blinn, Gen. Supt., Sandusky (O.) Gas and Electric Co.; W. F. Clansen, Supt., Portsmouth (O.) Gas Co.; Geo. Daugherty, with the Warren (O.) Gas Light Co.; S. Milo Dole, Mgr., Adrian (Mich.) Gas Co.; Frank H. Field, Mgr., Welsbach Co., Columbus (O.) Dept.; W. H. Gardner, Treas. and Gen. Mgr., Valparaiso (Ind.) Light and Fuel Co.; D. W. Low, Supt., Alliance (O.) Gas and Electric Co.; M. E. Malone, Gen. Supt., Madison (Wis.) Gas and Electric Co.; W. H. Mil-

ler, Supt. of Mfr., Cincinnati (O.) Gas and Electric Co.; S. E. Mulholland, Sec. and Treas., Lima Gas Light Co., and Lima Natural Gas Co., Lima, O.; H. H. Osborn, Salesman, American Tank and Fixture Co., Chicago, Ills.; G. A. Strain, Supt., The Bellevue (O.) Gas Co.; J. D. Shattuck, Supt., The Philadelphia Suburban Gas Co., Darby, Pa.; Dr. F. Schniewind, Consulting Chemical Engineer, The United Coke and Gas Co., New York, N. Y.

Respectfully submitted,
T. C. Jones, Sec'y.

On motion the report was adopted and ordered spread upon the minutes.

Election of New Members.

On motion of Mr. John D. McIlhenny the Secretary was instructed to cast the ballot of the Association for the election to membership of the applicants recommended by the executive committee.

The Secretary subsequently reported that the instruction had been carried out, and the President invited the newly elected members to seats in the convention and to take active part in the proceedings.

Report of the Secretary and Treasurer.

The Secretary and Treasurer submitted the following reports:

To the Members, the Ohio Gas Light Association—Gentlemen: I have the honor to present herewith the Eighteenth Annual Report of the Secretary and Treasurer for the period between March 20th, 1901, and March 19th, 1902:

New members admitted at the seventeenth annual meeting.	27
Released from membership	10
Deaths	3
Active members at this date	225
Honorary members at this date	13

As Treasurer, Mr. Jones reported a total receipt for the year of $1,158.31, an expenditure of $758.02, and a balance of $470.29. The report was certified to by the Finance Committee. On motion, the reports were received and ordered filed.

Letters and Telegrams.

The Secretary announced that he had received letters from the following gentlemen expressing regret at their inability to be present at this meeting:

Fred R. Persons, Toledo, O.; S. S. Stratton, Chicago, Ills.; W. R. Beal, New York city; A. B. Slater, Providence, R. I.; James Somerville, Indianapolis, Ind.; John P. Harbison, Hartford, Conn.; William Henry White, New York City; Alten S. Miller, New York city; Louis A. Ferguson, Chicago, Ills.; Alex. C. Humphreys, New York city; Senator Francis E. Warren, of Wyoming; W. E. Steinwedell, Belleville, Ills.; and E. C. Humphreys, Cincinnati, O.

The Secretary also read the following telegrams:

From B. E. Chollar, St. Louis, Mo., addressed to our President: "Brace up. You will find it dead easy." (Laughter).

From Irvin Butterworth, Denver, Col.: "Convey to the members my deepest regrets that I am necessarily absent. The first Ohio meeting that I have ever missed."

From Donald McDonald, Louisville, Ky.: "My spirit is with you, body unavoidably detained here."

Letters were also received from the following Gas Association officers, expressing their regret at not being able to be present:

Thomas D. Miller, President Western Gas Association; Henry W. Douglas, Secretary Michigan Gas Association; N. W. Gifford, Secretary New England Association of Gas Engineers.

The President—Next in order is reports of special committees. Is Mr. Light here? The special Committee on Advertising, of which I am the Chairman, with the consent of the Association will report to-morrow morning.

PRESIDENT'S ADDRESS.

The President then read his annual address.

[For the text of the President's Address, see Journal, March 31, p. 455.]

Committee on President's Address.

On motion, the address was referred for consideration and report to a committee of three, and the following members were named by the Secretary to serve as such committee: A. P. Lathrop, St. Paul, Minn.; George Whysall, Springfield, O.; and John D. McIlhenny, Philadelphia, Pa.

As to the Local Entertainment.

The President—The local gas interests here desire to show their appreciation of our presence in this city by affording us some sort of entertainment. Having been in some doubt as to what the nature of that entertainment should be, they concluded to leave it for the Association to decide. They have suggested two modes of entertainment and desire an expression of opinion from the members here present as to which they would prefer to accept. You are cordially invited by the Columbus Gas Companies to be their guests on a trip Friday next to Sugar Grove, 30 miles south of Columbus, where the extensive natural gas fields and the large pumping stations may be inspected. That was the plan originally decided upon, but it was doubtful how many would remain over and take the trip. The Gas Companies of this city stand ready to charter a special train to take us to the field and show us the 1,000-horse power pumping engine and to show us the natural gas field which supplies this and other districts. I am sure it will make a delightful trip. We can all be together and can have our little cliques, our love feasts or anything we desire on the way going and returning. The Companies would like to have an expression of opinion how many would prefer to take this trip or how many would prefer some other form of entertainment to be extended to us this evening? The other entertainment which will be extended to us as a courtesy by the local Companies, in case it is decided inadvisable to accept the invitation to go to the Sugar Grove natural gas field on Friday, is a theater party at the Great Southern Theater to-night. I am informed if we should take the trip to Sugar Grove we will get back about 3 or 4 o'clock in the afternoon, in time for you to take the evening trains to your respective homes. I would request everybody who would like to take this trip to rise to their feet.

It was then decided by a vote of 38 to 64 not to accept the invitation to spend Friday in visiting the Sugar Grove natural gas field.

Mr. E. F. Lloyd—Now that this courteous invitation of the local Gas Companies has been rejected, it seems to me it would be time to enter a sort of kind protest against local Companies entertaining visiting gas men at their expense. The larger Associations have been making a very strong attempt to relieve the local Gas Companies from such expense, and the Ohio Association to some extent has done the same thing. I think the present time would be a very good opportunity for an expression of opinion with reference to the acceptance of any hospitality from local companies where we hold our conventions, which will involve any expense on the part of such local companies.

The President—As your remarks now stand they are simply in the form of a suggestion. Do you want to put them in the form of a motion?

Mr. Lloyd—I will make that motion, then.

President Doherty—I would like to suggest, gentlemen, that this places us in rather a delicate position. The local Gas Companies understand thoroughly that there is no necessity for them entertaining us, and that is not customary for this Association to accept hospitalities of this sort from the local companies in the cities where it holds its annual meetings. However, the local Companies in this instance desire to entertain the Association in some way. There has been no talk of a banquet or any elaborate entertainment or anything of that sort. While I am thoroughly in favor of everything Mr. Lloyd said about putting ourselves on record against accepting these hospitalities, yet I am afraid we are a little bit too late to put ourselves on record at this meeting without perhaps having our action misunderstood by the local Companies.

Mr. Cline—We are all on record as far as that matter is concerned.

The President—If we can refer to some past action by the Association to the same effect, it would be all right, but to make a ruling now after the invitation has been extended to us might perhaps be misunderstood.

Mr. Cline—I can call to mind the fact that a few years ago a resolution was placed on record to the same effect, to-wit: That the Ohio Gas Light Association would not accept the hospitality of the local Gas Companies where its annual meetings were held.

The President—Mr. Lloyd's motion is before the house, but it has not been seconded.

Mr. Lloyd—I should say, Mr. President, that it is not with any desire to belittle the kindness, courtesy or hospitality of the local Companies extending us this entertainment. If the Ohio Association, after placing itself on record against accepting such hospitalities, and then accepts them in disregard of previous action, the city where we may convene another year will feel bound by the precedent established by the acceptance of the invitation this year to also offer us some form of entertainment. Unless we live up to our rule in that regard it will not amount to anything.

The President—The matter is in your hands, gentlemen.

Mr. Whysall—I second the motion.

The President—I will ask Mr. Lloyd to formulate the motion.

Mr. Lloyd—I move you, Mr. President, that this Association goes on

record and follows it up by acting accordingly, that it does not accept the hospitality of any local gas company in the city which it visits in any manner which will involve any expense to that company.

Mr. Whysall—I will withdraw my second to that motion. I did not thoroughly understand it when it was made.

Mr. Donald McDonald—If Mr. Whysall withdraws his second, in order to bring it before the house I will second it.

The motion of Mr. Lloyd as seconded by Mr. McDonald was then put to a vote and declared lost.

It was then announced by the President that the local Gas Companies of Columbus had provided tickets for a theater party at the Great Southern Theater, and that each member was requested to report to the Secretary and receive a reserved seat ticket.

The President—I will state, gentlemen, that the printing is not finished on some of the papers in the discussion on differential rates, and with the consent of the Association we will pass the discussion of that subject until the afternoon session, it being the next order of business upon the regular programme. If there is no objection to that course we will take up the Novelty Advertising Department, as edited by Mr. B. W. Perkins. If the members will notice, this programme is so divided that the questions and discussions which might be considered as purely commercial are down for to-day, and that the engineering problems are down on the programme for to-morrow, the effort being to divide the work of this Association between the commercial and the engineering departments, so that if there is anybody who can attend the Association for only 1 day he can attend on that day when the subjects in which he is most interested will be before us for discussion.

Mr. B. W. Perkins, of South Bend, Ind., then read the following budget under the heading of

NOVELTY ADVERTISING DEPARTMENT.

No. 1.—By Mr. A. L. Woollen, Fishkill-on-Hudson, N. Y.: "I am rigging up lamp posts with nice globes, to be placed in prominent places about the city, giving the great advantages of gas as fuel and light painted on the globes with nice letters. Reducing complaints, and increasing the consumption of gas for lighting by placing a photometer in the window with a card showing the working of it, and managing to keep it at 24-candle power. Several mornings during the month I place pancakes, nice toast, and other materials on the different appliances in the window, and find it very effective."

No. 2.—Mr. H. L. Olds, of Bloomington, Ills., always keeps a gas range, surmounted by a sign, on his wagon.

No. 3.—Mr. C. B. Pattrell, Mansfield, O., uses solicitors whom he supplies with literature, etc., and pays them the $2 that the range is sold for over the cost. A record is kept of the reasons why gas is not used, and future visits are made to try and overcome their objections.

No. 4.—Mr. Eugene Printz, Zanesville, O., who is in competition with natural gas at 20 cents per 1,000, keeps his lighting business by house-to-house canvass, and supplying incandescent gas burners with renewals and repairs free.

No. 5.—Mr. John McMillan, Conneaut, O., uses his show windows, dressed in a novel manner, a photo of which he kindly furnished. He says: "We have given away 1,500 feet of gas to all new consumers each spring, in order to get them to come on sooner, and this has proven a very good 'ad.,' for the reason that the new consumer receiving the 1,500 feet would use a good portion of it showing it to his neighbors, as he would tell them 'it did not cost him anything to show it, as the Gas Company had given him the first 1,500 feet used,' and this would get his neighbors to wanting gas. I can trace quite a number of our consumers to the giving away of 1,500 feet."

No. 6.—Mr. J. T. Mason, Milwaukee, Wis., uses a postal card, the reverse side of which contains well executed half-tones of prominent places, buildings, parks, monuments, etc., in and about Milwaukee; above or below the picture is printed in red ink appropriate short notices of gas and its uses. These cards are sent to all non-users of gas.

No. 7.—Mr. C. R. Faber, Toledo, O., uses the newspapers, theater programmes, and the backs of gas bills. Upon the backs of the latter are short, catchy "ads.," illustrated with an appropriate picture to arrest attention.

No. 8.—Mr. J. M. Robb, Peoria, Ills., uses press clippings supplied by parties who are in that business.

No. 9.—The Northwestern Gas Light Company, Evanston, Ills., has a huge sign on top of one of the gasholders, on which is put in letters, hree feet high, "Cook with Gas."

No. 10.—Mr. Irvin Butterworth, Denver, Col., says: "If you want an 'ad.' that is a real novelty, here is one, the credit for which belongs to Mr. Ben A. Block, of this city. Let the gas company carry the following 'ad.' in the daily papers for say a week: 'Wanted to rent, all the dogs in the city, just for 2 days at 10 cents per day; you keep the dog and we pay you the cash. Any old dog will do. Bring your dogs to the gas office at 10 o'clock next Saturday morning.' The carrying of this 'ad.' will cause no end of comment and speculation, and curiosity will be aroused to a high pitch. At 10 o'clock on the Saturday designated, there will be a big crowd of men, boys, girls, and barking and fighting dogs gathered before the gas office, some with dogs to rent, and others to see what on earth the gas company wants with so many dogs, or with any dog for that matter. As dogs are brought in turn to the gas company's 'dog clerk,' let him tie about the neck of each dog a tin, leather, or other suitable tag, on which is stenciled the legend, 'Buy a gas stove.' Then let him tell the owner to bring his dog back in 2 days with the tag on him and get his 20 cents rent money. If this scheme does not sell gas stoves and popularize the company, then that community is simply too 'dog-goned' dignified to appreciate a good thing."

No. 11.—Mr. C. A. Schwarm, Lorain, O., uses printed matter, which is distributed among consumers; they are for enlightening them about the merits of coke, gas and electric lights; they also publish notices of fires and explosions caused by gasoline or acetylene, which are obtained from clipping bureaus.

No. 12.—Mr. Henry L. Doherty, Denver, Col.: "One of our earliest advertisements last season was an 'ad." in the street cars. The cards were changed every fourth day, and each successive card read as follows: 'If'—'If you love'—'If you love your wife'—'If you love your wife buy her'—'If you love your wife buy her a gas stove.' We adopted this method to attract people's attention to the space, and we think it was effective. Every Friday morning we have a cooking school at our office. By arrangements with one of the butchers of Denver, we had a butchers' block set up in our office and a side of beef cut up in view of the class to show them the location of the various cuts of meat, and to tell them the best uses for these different portions of the beef. We are now giving the matter of marketing our coke considerable attention, and have done more or less advertising to poularize it. The only novelty we have introduced in this department has been the purchase of a number of nice, white duck bags, which we filled with coke and gave away as samples. We have also had small boxes made, containing 3 compartments, one for each different size of coke, and these have been placed in the numerous district offices of the A. D. T. Company, we paying their agents a commission of 25 cents per ton on all coke they sell. In the Milwaukee (Wis.) gas office they have a similar arrangement to this, which I think is even more effective. They have their coke contained in large, clear glass jars in a prominent place in their office, and at a favorable height to catch the eye of every one entering the office.

"We have the following additional forms of advertising here, none of which is decidedly novel. We put some kind of a paster on our bills each month, containing some advertisement or notice to the consumer. We have 2 or 3 movable bases to contain stoves, on which we place different sample ranges for display in some prominent portion of our office, or on the sidewalk in front of our office. We furnish the demonstrator, the range and the food to any church in town, which wishes to give a cooking demonstration, the church generally charging an admission. These church demonstrations have been very successful. We also keep a demonstrator out on what we call "House Demonstrations." A solicitor borrows a kitchen and invites in all the neighboring ladies who do not have gas stoves, and a demonstration is then given of scientific cooking on an up-to-date range, a display meter being attached to the supply pipe of the stove to show how much gas is used.

"Just prior to Thanksgiving we rented the large assembly hall at the Brown Palace Hotel, and advertised to give a free demonstration of how to cook and serve a Thanksgiving dinner. We cooked a full course dinner, and had a fancy table set to show just how to do the thing in proper style. Admission was by ticket only, and the scheme was so popular that we had to repeat the demonstration several times to accommodate the applicants for tickets. The Standard Oil Company has an agency here for Blue Flame Oil Stoves, and a very prominent corner to display the goods. In a measure, to counteract their efforts on oil stoves, we carried for several weeks an advertisement in all the street cars in the city, and occasionally in the daily papers, worded as follows: 'If you are going to buy a stove, buy a gas stove, otherwise you are buying what progressive people are throwing away.'"

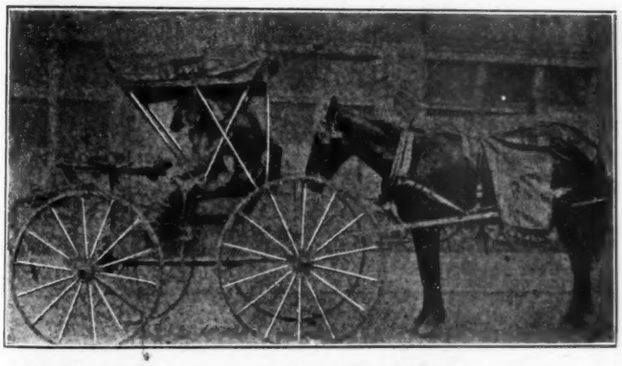
No. 13.—Mr. R. I. Spears, Little Rock, Ark., last season used the daily papers and distributed 500 booklets each month, and followed with personal calls from solicitors. As it resulted in the sale of over 300 ranges, they consider it a good scheme.

No. 14.—Mr. A. P. Lathrop, St. Paul, Minn., carries a one line "ad.," "Cook With Gas," over the daily menu card that is published in their papers.

No. 15.—In South Bend, Ind., we have attractive "ads." painted on all the waste paper boxes that stand on the street corners for the convenience of the public. We also had some large wood sign boards about 6 feet square, on which was painted, "Use Gas for Fuel," "Use Gas for Light." These signs we nailed to posts set in the river as near the center as the depth would permit, where they were in plain sight of everybody. While this is a very simple thing, we never did anything else in the advertising line that attracted more attention. We also had large bill boards, 12 by 16 feet, put upon the guide frame of our larger holder, upon which we pasted posters, etc. Another attractive advertising scheme was large stencils cut from stiff paper, backed by tissue to hold the letters together and diffuse the light. These were made large enough to entirely fill the lower sash on the front windows, a light was left burning all night, and the upper sash covered with a shade. By this means the light could only penetrate the portion covered by tissue paper, and could be distinctly read on the opposite side of the street. These stencils can be cut either by first making the letters out of tin, then laying them on the paper and cutting around them with a sharp knife. We have also used large colored posters, which are posted at intervals during the summer on boards that are not likely to be used for other purposes. Another good "ad." noticed recently was a long banner, which one of our enterprising laundrymen had attached to the top of a scaffold of an unfinished smokestack. It attracted a lot of attention, and we regretted the fact that we had not thought of it ourselves.

No. 16.—St. Louis gas people send a copy of a large poster, which we know from experience is a good thing.

No. 17.—Another good "ad." is shown by the accompanying cut and description, taken from the New York *Herald*·



"There's a cart before the horse automobile in Baltimore that is attracting much attention, as it is designed to do, being a perambulating advertisement. A small gasoline motor, concealed under the seat, is connected with the front axle of the buggy, and furnishes enough power to not only move the buggy, but pull the horse along as well, in case he should balk or refuse to go. The vehicle is steered by a wheel fastened in front. It is merely an ordinary wheel with the rim cut off. By an ingenious scheme, the escape of steam is controlled so that only a small jet gets out from the bottom of the wagon box, and the exhaust is effectively muffled. At a distance of 50 feet it appears as if the horse was furnishing the motive power, but he is merely in the fills for ornament and not for use."

Another novel scheme recently seen in a neighboring town was a two-wheel cart, the wheels of which were made of plank, the hubs being made of cast iron, the holes through the wheel, instead of being made at right angles to the wheel, were made at an angle of about 10°. When this vehicle was being drawn through the streets by a horse it makes it look as though it was falling to pieces at every revolution of the wheels.

Discussion.

The President—The subject is now before you for discussion. I hope you will avail yourselves of this opportunity to offer any suggestions, comments or criticisms apropos to this department.

Mr. C. W. Andrews—I know that we all feel very greatly indebted to Mr. Perkins for the work which he has done in getting this department started, for the amount of valuable material he has brought here and the profitable suggestions he has made. I think it will be of value to all of the members of the Association. Therefore, I tender a hearty vote of thanks to Mr. Perkins for his efforts in this direction. [Seconded by Mr. Stone, and adopted.]

The President—This report is very interesting. It covers a matter which you cannot get in any other way except for someone to dig it out of our membership and other gas men who are not members of this Association. If anything is good in the way of novelty advertising in one town it can be repeated in every other town of the State and prove just as effective. The suggestions with reference to the various forms of advertising as contained in this report should bring to the minds of the members here present other forms of novelty advertising which should be brought to the attention of the Association. If any member has anything to suggest along this line, I am sure we will all be glad to hear from him now.

Mr. Perkins—I do not think the membership at large appreciates advertising in its fullest sense. There is a good deal of advertising in the shape of novelty advertising that is as effective or more effective than ordinary newspaper advertising and costs very little. There are many forms used by merchants and persons engaged in other lines of business which can be applied to the gas business as well as to any other kind of business. Judging by the trouble I have experienced in gathering up the suggestions contained in my report, I do not think the membership appreciates its importance or realizes all of its difficulties. The various forms of novelty advertising used in other lines of business can just as well be applied to the gas business as to the drygoods business, or the hardware business or any other line of merchants, and if this department is to be continued it should receive better attention than it has received in the past by each individual member of this Association.

Mr. M. E. Malone—Is it in order, Mr. President, to state some forms of novelty advertising?

The President—Yes, indeed. Now is the appointed time.

Mr. Malone—We adopted a plan at Madison recently, too late to send it to Mr. Perkins; in fact, we only adopted it 2 or 3 weeks ago. We bought 5,000 toy, wooden whistles at six-tenths of a cent apiece and distributed them among the school children. We gave a few away and it did not take very long for every kid in town to find it out. The children each obtained one of these toy whistles and went to school. The teachers, of course, took them away. They came back and got more. Some of the children were turned out of school for there persistency in noising about the merits of artificial gas for cooking. Of course, each whistle had stamped upon it the words, "Cook with gas," or, "Buy gas stoves," or, "If you love your wife, buy a gas stove," etc. In a few days we began to get letters from our consumers saying that they were already cooking with gas and would promise to induce their neighbors to cook with gas if we would only quit giving away the whistles. The newspapers of the city also took up the subject. One paper in particular I remember published a letter signed, "A Nervous Mother," saying, "If you will withdraw your whistles we will all cook with gas." The jewelers and music stores were all kicking because it had stopped the sale of Jew's harps and mouth harps. (Great laughter.)

Mr. F. W. Stone—I agree with Mr. Perkins that I do not believe we all appreciate the full value of proper advertising. It is not only necessary, it seems to me, that a gas company attract the attention of people, but it is necessary also to make them understand the merits of the commodity you have for sale. You must not only bring it to their attention but you must bring to their attention some advantage they will gain by the use of it and put it before them in such a forcible way that they will think about it afterwards. When they see an advertisement, there should be something about it to impress it upon their minds, so that it remains with them. I have my doubts personally whether the ordinary newspaper advertising which we do, outside of keeping the goodwill of the newspapers, is the success we would believe it to be, or whether it makes the impression we would like to have. Unless we use a full page "ad." or a half page "ad.," or something of that kind, I doubt very much whether it attracts attention to amount to anything. I think the ordinary sized "ads." in the newspapers are too often skipped over, so that we get but little benefit from them. It is my impression that street car advertising display signs, or something of that kind, is better for the gas company than the ordinary "ads." we see in newspapers. I would like to hear the subject discussed along that line. We have gone into the street car advertising to some extent the last year and find more comments made from that form of advertising than

we do from newspaper advertising. I think the cards that we put in the street cars the last year caused more comments than all of the newspaper advertising done for the last 2 or 3 years. It attracts more attention and you hear more remarks and comments about it. I want to call that kind of advertising to the attention of gas men wherever they can have the advantage of using it. This last month I had a card painted, "Don't dirty your hands! Use gas for both cooking and heating;" and on a cut of a hand I had the printer splash his hand in the ink to make an impression on the card in that way. It was the kind of an "ad." that attracted everybody's attention in the car, and it created quite a discussion as to whether it was a woodcut or whether the printer had really used his hand to make the impression. The day before I came here I presume a dozen people asked me how it was made. I simply call attention to this to suggest that I think it is a very good way of advertising.

Mr. T. Littlehales—I had a good deal of success in another method that has not been referred to to-day. That is, setting up cook stoves on the sidewalks and cooking anything that people would bring along, and giving notice along the street the day before that the stoves would be set up at such-and-such a place. I think I can safely say that in every instance where a stove was put up along a street or boulevard not less than 5 or 6 sales of stoves would be the result each time. We could calculate on going onto any street we might select and selling 5 or 6 stoves as the result of setting up one on the sidewalk and cooking anything that any of the neighbors cared to bring along. We have sold a great many stoves in that way and have found it a very effective way of advertising.

Mr. Lloyd—It may be a matter of some interest for the members to know that at Adrian, Mich., we are using a system of general advertising which was put out by a concern in Boston, I think by the Home Science Publishing Company. They furnish a little booklet which will go in an ordinary envelope, and each month suitable to the season there is some appropriate cut. It consists of probably 8 or 10 pages. We are putting out about 2,000 per month, I think, and distributing them by messenger boys. The attention of the people to whom they are sent is attracted. They contain a comical cut appropriate to the season; as, for instance, early in the fall they will take up the question of when you will make your preserves after the summer vacation, and will give some general illustration on the subject. Then they will take up the heating question and the lighting question, and each month there is something different. We have not run it long enough to find out wha the effect of it is, but judging from our experience so far it seems to be a very useful and profitable means of bringing before the people the advantages of gas for cooking or illuminating. The expense to us I think is about $100 for the year's service.

The President—I think Mr. Hess should be able to give us some valuable experience on this subject.

Mr. Frank Hess—We are advertising now to put in stoves to May 1st for $1.50 off. We sell stoves at a profit the rest of the year. It may be hard to sell stoves in some cases at the regular price after May 1st. We are also using a receipt for planked fish, in a book gotten out periodically by one of the churches, which makes a very attractive and useful "ad."

Mr. J. W. Dunbar then being called on by the President said—I have nothing that I can add to the experiences already given. I have nothing novel or new to suggest at this time.

Mr. John Franklin, Cincinnati, O., being requested by the President to state his experience in advertising, said—We are not doing any advertising at all, except sending out solicitors and making a house-to-house solicitation, especially along the lines of some of our new mains. These solicitors, of course, explain the advantages of the gas stove, and instruct new consumers in the economical use of gas, etc. That is about all the advertising we do.

The President—Before closing the discussion I want to say one word with reference to the importance of this department. The novelty advertising department of this Association was inaugurated for the benefit of a certain class of our membership—it was inaugurated for all of our membership, but more particularly for a certain class. There are lots of men who want to advertise, but who cannot advertise in the usual channels because it is too expensive. They cannot get the necessary appropriation from their directors. One definition of novelty advertising might be "that form of advertsing which by its novelty will attract attention without incurring any great expense," thus enabling these gas companies, without going to any great expense, to call the attention of the public generally to the merits of gas for different purposes. Now we not only want the form of advertising done by gas companies of a novel nature, but we also want our members to watch the advertising done by other people, and where they see any advertising done that would be applicable to the gas business of a novel and inexpensive nature, to send it in to our Editor, so that our members who have not the funds to advertise in the usual way will be able to take advantage of these novel and inexpensive forms of advertising gas.

Prof. W. D. Marks—I might mention the fact of one gentleman engaged in the coke business who advertised the sale of coke upon a banner big enough to use very large letters, which he hoisted up in the center of the city and which is constantly flying in the air. It is unnecessary to add that he sold all his coke.

The President—As a proper illustration of the benefits to be derived from this department, I might say I think that idea as suggested by Prof. Marks originally came from our novelty department. Mr. Perkins used that mode about 5 years ago, and I think covered it in his first report to this Association. That is just exactly what we want to do; to let others know what has proved successful elsewhere.

Mr. Hess—The mode of advertising spoken of by Mr. Perkins last year, of tying samples of coke up in ribbons, is a mode of advertising which we have used with great success, and I think I can trace the sale of our entire stock of coke with the exception of two cars to that advertisement. Our coke is not crushed. We sell it $4 per ton delivered, just as it comes from the retort.

Mr. Boyle—In our part of the State we sell soft coal by the bushel. I manage to get our patrons to weigh their coal in 16-inch hods, which will hold a half bushel. Then I get them to compare the cost of the 16-inch hod with the cost of the gas consumed to secure the same result. Coal, as you are all aware, is generally sold by the ton, but we sell it by the bushel (9 cents a bushel), and I think that a bushel of coal will not go as far as gas costing the same amount. We sell our gas at $1.50 for illuminating and $1.25 for fuel, and $1.25 worth of coal will not go as far as $1.25 worth of gas, in whatever manner it is consumed, whether by grate or range.

Mr. John D. McIlhenny—Referring to the sale of coke, I know of a plan which has proved very effective. An advertisement that a barrel of coke would be delivered at your house for 25 cents. That seems cheap. Everybody knows what the size of a barrel is, and the quantity looks large and the price looks cheap. It has been found to be a most effective way of advertising. While on this subject of novelty advertising, I think we would all like to hear from Mr. Moses, who, I imagine, could give us some good points upon it.

Mr. Frank D. Moses—I do not think I could add anything to what has been said. I have not struck anything new this season.

President Doherty—You are degenerating if you cannot think up something new.

Mr. Moses—I will try to think up something by the next meeting and be ready to report.

The President then announced that the discussion on the topic

ARE LOOSE-LEAF LEDGERS DESIRABLE FOR GAS COMPANY RECORDS?

would be taken up.

The first contribution on the subject was the following, prepared and read by Mr. A. P. Lathrop, of St. Paul, Minn.:

The question assigned me was: "Are Loose-Leaf Ledgers Desirable for Gas Company Records?" Assuming that the question was to apply to other records than simply ledgers, I will take up the card system and loose-leaf ledger system generally.

The modern system of accounting in gas offices necessitates a great deal more detail than was necessary a few years since, when business was small, and one man could be depended upon to furnish all kinds of information from memory, and record books were of but little importance. Inability to take care of the extra details necessitated by the increase of business, without adding heavily to the expense account, has probably deterred many from keeping the records which they should. From personal experience I know of nothing which has helped on these lines more than the card and loose-leaf systems.

For application blanks, meter records, stove records, street lamp service and main data, indexes, etc., the card system is especially well adapted, in many cases one card doing away with the use of two or more books. In addition to this saving, the ease with which filing work can be done and reference be made effects a very material economy in time.

Where it is not considered advisable to use cards, loose-leaf books can frequently be used to very great advantage. The greatest objection I have heard raised to the loose-leaf ledgers has been that the leaves may be lost or wilfully destroyed, thus doing away with the permanency of the record. The question as to whether the courts would consider records kept in this manner as being reliable as would be those kept in the

old-fashioned, bound book has also been brought up against this system. I feel the employment of careful help will eliminate in great part any danger from the losing of leaves, and that the wilful destruction of the leaves could just as well apply to the bound books, but the ability to prove the accuracy of the records, if we were obliged to present them in court, is a very serious question, so serious that I should hesitate to recommend loose-leaf ledgers for our general books; but for petty ledgers I am much in favor of them. With them there is never the bugbear presented to bookkeepers of transferring a great number of accounts from the old ledger to the new one, nor does he have a vast amount of dead material to look through when drawing off his balance. By easy reference he has a complete record of every account with which he has any dealings, and the ledgers practically index themselves.

For the consumers' ledgers, where practically all the accounts are opened and closed monthly, I have never been able to see any advantage in using the loose-leaf system; on the contrary, it has always appeared to me as if much more time was required in keeping the records on that kind of book than on the form which has been in general use by most gas companies for many years.

The next contribution on the topic was the following, submitted by Mr. Charles S. Ritter, of Columbus, O.:

A fairly satisfactory answer can probably be given for this question, but a more intelligent one could be given if the local conditions under which the accounting is to be done were known.

For such records as the petty ledger, the matter will be readily decided by any intelligent and progressive bookkeeper. In the case of the consumers' ledger, however, where one book is but a small part of the whole, the accounting is divided among a number of bookkeepers, and various other clerks must have access to the books, the question assumes a somewhat different aspect. Especially is it so in a large office where 50,000 or 60,000 accounts are kept, and as many as 50 or 60 clerks have access to the books. Obviously, whatever system is used it must be simple, easily understood, and accessible.

By simplicity is meant that the printed form must be as simply and plainly arranged as possible, with due respect for the amount of labor required to record a given amount of data; and the placing of the data into its correct sequence and with proper regard for its relationship to other forms already in use or to be adopted.

It must be accessible; and by this several things are meant; viz., the ledgers must be handy to all who use them, and handiest to those who use them most; they must contain the fewest practicable number of accounts, in order that as many as possible of the ledgers may remain in the rack, handy for any who need to refer to them. In these respects the loose-leaf ledger has a decided advantage.

Being small, it will conveniently permit two bookkeepers to work at each desk, thus requiring a minimum of floor space, and reducing distances from any part of the office to the ledger rack. By using 48-pound double-bond paper, about 1,000 sheets can be carried in a 3-inch ledger. One ledger keeper can keep 4 ledgers, making it possible to have at all times at least 3 in the rack. The use of this thin bond paper is also an economy in space required and weight of books.

No indexing is necessary with the loose-leaf, as the sheets can be kept according to street and number, making the location the unit and index to the account. By this means an account can always be found at one place, while, with the old style ledger—if the space saved for new contracts has been filled—the proper sequence of the accounts will be broken.

A moderate sized sheet will carry accounts for 4 years, thus cutting out the necessity of re-writing ledgers every year, and saving all of the attendant annoyance, such as losing track of accounts, and being obliged to employ extra and inexperienced clerks to assist in the transfer. If you have an addressing machine, the sheets can be printed in a very short time, reducing the troubles incident to the transfer to a minimum. As your books will run in series of 4 years, back references are easily made, since it is not necessary to go through a different book for each year's accounting.

Perhaps the first, and apparently most serious, objection that will be offered to the loose-leaf is the ease with which an account may be surreptitiously "dropped" or removed, either permanently or during an audit or inspection of the books. Cases of this kind have happened; in fact, the condition of the City Savings Bank of Detroit, which was recently looted by its Vice-President, was concealed from the Directors and Bank Examiner through the removal of loose-leaf ledger sheets during the examination by Directors and Bank Examiner. State Bank Examiner Maltz will recommend to the next meeting of the Michigan State Legislature that a law be passed prohibiting the use of loose-leaf ledgers in the banks of the State. It is true, of course, that the removal of an account is most easily accomplished with the loose-leaf ledger, but, it hardly follows that the loose-leaf causes dishonesty, and it is pretty certain that any system that might be adopted would not entirely prevent it. Where there is a will to be dishonest, there is usually a way. Then, too, there is the contingency that the loose leaves may be accidently dropped or misplaced. Theoretically these are grave objections; practically, they are only remote contingencies.

A serious disadvantage of a loose-leaf system, however, is the unsatisfactory way in which footings are kept. An adding machine is necessary, and the tapes used to record amounts of gas sales and cash receipts are anything but convenient. They are cumbersome, unsightly things, not at all satisfactory to a bookkeeper who likes to see books neatly and exactly kept. These footings cannot be kept with the ledger, but must be filed separately. The method of checking-back with these tapes is also very awkward, there being nothing on the tape to indicate where, or to what account an amount belongs, except that the amounts are alike and in same sequence.

These observations, which are the result of experience with both systems, may be of service to some who are contemplating a change, and it is with this point in view that the above comparison of the two systems is submitted—simply for what it is worth.

Of course, it must be understood that this comparison is very general in a way, as it must necessarily be, on account of the various different forms of both styles of ledgers, as well as other unknown conditions. Good accounting is being done with either system. In some cases a change to the loose-leaf might be an advantage; in others a consequent disturbance of the established office methods would be too great and would offset all of the advantages of a new system.

After all, bookkeeping is only "common sense." Any system of bookkeeping or style of book is as good, or as bad, as the bookkeeper makes it.

The third communication on the topic (by Mr. Ernest W. Bell, of St. Louis), in the absence of the author, was read by Mr. John D. McIlhenny:

Regarding the use of loose-leaf ledgers for gas companies records and accounts, I will say that in St. Louis we make use of them very extensively, and find them extremely desirable, thoroughly reliable, and economical to a great degree. Bound books do not offer such perfection and satisfaction in record or accounting work that can be and are obtained with the use of loose-leaf ledgers and cards. A few disadvantages which are sometimes raised against the loose-leaf books, but which, from our experience, did not prove so alarming, are more than offset by the accurateness and economy gained.

In the matter of ledger leaves not standing in court, I will say that even a bound ledger will not hold unless the records therein are substantiated by the original entries, and these are always on loose sheets, such as vouchers and invoices, so that objection cannot be advanced to the loose-leaf book's discredit. The matter of the leaves being lost or wilfully destroyed has not occurred to us as being a serious objection. In fact, experience has shown us that such annoyance does not exist. However, to guard against this point, we have in the important books devised the following scheme:

All leaves are numbered, and are countersigned by some one in authority. They are then given to the bookkeeper, who is held accountable for them. At any call of the auditor, secretary or such person the bookkeeper must show the full number of leaves issued to him. The signature on each leaf will prevent any tampering with the leaves for dishonest purposes.

We find our greatest saving, for financial, as well as record and shop work, is with the use of the loose-leaf consumers' ledger. This is especially so where a great number of accounts are kept. The leaves in the ledger correspond to the leaves of the meter route book (which is loose-leaf), and are arranged so the gas bills can be handled without resorting. This cannot be done with bound books to advantage, as the growth of the city cannot in any way be determined, and it will not be long before a bound book will have the entries all out of order.

Discussion.

The President—Gentlemen, you have heard the three written discussions of the subject of loose-leaf ledgers. I do not think they are conclusive at all. Has anybody anything to add?

Mr. E. F. Lloyd—I have used the loose-leaf system and the card system for a number of years, and I don't think I could keep house without them. There is only one place in the gas works in which I do not think very much of the loose-leaf system, and that is the consumers' record or register. For all other services I do not think there is any-

thing equal to them. We use them for meter and complaint records, and orders of all characters, route books, and in fact, for every system and department of the works, even down to the monthly records of the operation of the works, with the solitary exception I have indicated. For consumers registers, however, I think they are too cumbersome. The nature of that record is largely in bulk, and while you wish to find the individual items of the accounts, you do not so much care about them after they have been once settled, merely so that we can refer to them. The ordinary book in which a large number of consumers appear on one page, is much more convenient in arriving at the footings and in ascertaining your output and receipts than the loose-leaf system. I think that a combination of the two, whereby the ordinary ruled sheet, having perhaps 30 or 40 consumers on a single page—in itself a loose-leaf system—is the better mode. So that you can insert extra leaves when required, but not have a single leaf for a single consumer. In that instance, there is too much of it to handle. If you have 1,000 consumers, you would have a 1,000-page book, and you practically handle it all every month. Now, for the route book, we use an independent leaf. That book is made up of sheets printed in black, for the original entries in the ledger. Those entries, of course, cover a certain space. If we insert a consumer and have no room for that consumer on the regular page, we enter his name in an irregular place in the ledger, and for that purpose we use in the route book a red sheet, and when that red sheet is put in its regulation place in the book, when the entry clerk is making up the record from the route book and runs across one of those leaves, printed in red, he at once knows it is an irregular entry. There is no difficulty in the reference, because each line of the register is numbered, and that number is placed upon the individual leaf in the route book, so that when this red leaf is struck the number is referred to, and it instantly gives the number in the register where that entry should be. It can be done very quickly and without particular trouble. That is a modification I would suggest in the loose-leaf ledger for consumers records, but for all other purposes there is nothing to equal the card system for facility and for getting at results promptly.

Mr. C. S. Ritter—In addition to what I have said in my paper, I would like to recommend, in the use of a deposit ledger, that the old style ledger be used, on account of the importance and permanency of the accounts, some accounts lasting 10 or 15 years. It will obviously be seen that a permanent record must needs be kept, and our experience has been that it is much easier to keep it balanced by the use of the regular ledger system. We are using the card ledger at the present time, but as quickly as we can we are going to transfer it to the regular ledger system.

The President—Then you would recommend the regular system for deposits?

Mr. Ritter—Yes, sir; for consumers' deposits.

The President—We have a longer programme to cover at this convention than we have ever had before, so it will be necessary for us to stick strictly to business in order to get through in the time allotted to us. If agreeable we will now take up the discussion on the subject

HOW MAY COMPLAINTS BE BEST CARED FOR?

In the absence of Mr. Frank W. Frueauff, of Denver, Col., who was not able to attend the meeting, I will call on Mr. C. W. Andrews to read the former's written discussion on this topic.

Mr. Andrews read as follows:

The success and permanence of a gas company depend, in a large measure, on the feeling of the public toward it. That this feeling be one of interest, and so far as possible friendship, requires constant watching and the utmost care. Most of the ill-feeling against a company is shown in the complaints received at the office, and here must the work of reform be carried on. Prompt and careful attention given each complaint will soon show results and make many friends out of former dissatisfied consumers.

A systematic handling of this branch of the business is absolutely necessary; otherwise trouble will result from loose methods of receiving the complaints and failure to attend to them promptly. If a consumer reports trouble at the office to the first clerk he sees, who in turn refers it to another clerk, or intends to do so and neglects it, confusion as to the cause of trouble often occurs. The wrong man is sent, or goes at an inconvenient time, or fails to take with him the proper tools, and not infrequently no more attention is given the order. No one can be found who took the order, and no one can be held responsible for the neglect. The consumer gets out of patience with such carelessness and tells it around, to our harm and discredit.

The method adopted in Denver, and now in successful operation, is briefly as follows: All reports of trouble, dissatisfaction or misunderstanding are received at one window by a clerk, whose business it is to make a personal matter of each report and follow it to a satisfactory end. He is also provided with telephone connection, so that all reports come direct to him. As the reports are received, they are entered in a book which is ruled with headings as follows: Order number, name and address, time of receipt of order; and, under a heading, "Nature of complaint," the following sub-headings: Leak; poor light; no light; high bill; set complaint meter; adjust stove; adjust heater; put up pipe; complaint regarding employee; miscellaneous complaints; also heading, "Attended to by; date; remarks." The complaint being received and understood thoroughly by the clerk, he makes out an order covering the facts as entered on the book. This order is given to the proper employee, who executes the order as promptly and carefully as possible, reporting on the back of the order the time the order was executed, what was done, or what facts he learned in investigating the complaint. When he has completed his work, the order is returned to the clerk, who examines same, and enters the record opposite the order on his book, then filing it numerically for future reference. He then makes out and sends to the consumer a return postal card, reading as follows: "On blank date, you reported blank" (here filling in the complaint shown on his book). "Kindly fill out the return postal card, stating whether everything has been done to your satisfaction. Your prompt reply will be appreciated. Yours truly, The Denver Gas and Electric Company" On the return portion of the card is marked the number of the order for convenience in checking when returned.

This last feature, the return postal, has proven most successful, and has occasioned many complimentary remarks from our consumers. It has accomplished a two-fold purpose. First, it enables us to know that the consumer has been attended to properly and is satisfied with the work done, and again is a check on our employees; we finding but few cases where they had to be sent back again to complete or change their work. Their knowing that the consumer was expected to advise the office after completion of the order, stimulated them to better efforts.

These comparisons show the results of one month, as compiled from postals returned: Postals returned to office, 48 per cent. This is accounted for by the fact that many people do not bother to report back to the office when the work is satisfactorily done. We feel if it was not properly done they would take this means of advising us. Of those returned, 79 per cent. reported everything "O. K.," and 62 per cent. of these added thanks for the interest shown.

Thirteen per cent. reporting back said work was not done satisfactorily. In these cases the original order was taken out, the employee notified of the second complaint and sent again to remedy it. After this was done, a second postal was sent to insure a satisfactory job.

Eight per cent. of those reported back stated that the trouble complained of was executed satisfactorily, but that they wanted to report other troubles; these orders being received and executed as original orders.

We have been able through this means to locate the most of our dissatisfied consumers and attend to their wants, and the beneficial results accomplished are most gratifying.

The President then called upon Mr. M. E. Malone, of Madison, Wis., who read the following contribution to the topic under discussion:

In giving my views on the subject, "How May Complaints be Best Cared For," which Mr. Frueauff has so ably discussed, I desire to heartily indorse each and every one of the statements contained in his paper, as they bring up for consideration in a most concise manner a subject that is of the utmost importance to the management of a gas company.

Perhaps the briefest manner in which I can best express my views on this subject is to give a short synopsis of our practice at Madison, and although it embraces many of the best points of that in vogue in Denver, there are some features quite different, and perhaps worthy of consideration.

During 1896 we were impressed with the importance of having some regular method for handling complaints, and although the method first adopted was rather crude, it has been gradually improved upon until now it is entirely satisfactory.

A "Complaint Clerk" is stationed at a desk near the entrance to the office, where complaints of every description, for both the gas and electric departments, are received and entered in the proper complaint book, there being a separate complaint book for each department, no employee other than the complaint clerk being allowed to receive or enter complaints.

Our complaint books are specially ruled, the year and month being written at top of page, while the day of the month is written to the left of each order, where each consecutive number is stamped with a Bates'

numbering machine. Four lines are allotted for each order, and sufficient space is allowed on the right for entering the written report turned in by the fitter after complaint is attended to, thus giving us the record in one place of the entire transaction. By numbering each order consecutively, you can tell almost at a glance the number of complaints received daily, monthly, or for the entire year.

When a complaint is brought to the office, the person bringing same is directed to the complaint clerk, who is thus enabled to get the exact nature of the trouble, and enter it accordingly. For instance, if party filing the complaint says: "There is something wrong with our gas stove," it is the duty of the complaint clerk to ascertain as nearly as possible what that "something" is—it may be a leak, the oven may not bake properly, or one of the burners may be out of order. Thus it is essential to get the order correct, so that the fitter sent to remedy it can proceed in an intelligent manner.

All telephone calls are answered by the complaint clerk, who can thus get complaint orders direct that are sent in this manner. The complaint clerk is held accountable for the proper execution of every complaint received, and issues orders in writing to the different fitters or trouble men. The complaint clerk has an assistant, who enters all orders received during the evening and at meal hours, but does not issue orders, unless it is imperative from the nature of the complaint that it be attended to at once. A written order is issued to complaint men for every complaint received, and he is required to report in writing "How complaint was remedied;" and, "What more, if anything, is required?" and sign his name to order before turning it in.

We have an inspection made twice a year, each spring and fall, of every main and service trench opened during the previous year, and where settlements or other repairs are found necessary, an order is issued to the superintendent of distribution to have the same attended to at once. We also have an understanding with the city's street superintendent that he will confer a favor on us if he will report to us any trouble found where our Company has made excavations. In this manner we not only avoid any friction with the residents or city authorities, but the fact of the case is, we receive the highest praise from all sides for the manner in which we repair our trenches, thus preserving as far as possible the streets of our beautiful city.

We recommend the use of a bicycle for complaint men, as we find it cheaper than a horse and wagon, or paying street car fare. One of our complaint men kept track of the distance traveled during the year 1900 by the use of a cyclometer, which indicated he covered a distance of 3,070 miles, or about 10 miles daily, counting 300 working days to the year. This distance was not put in entirely on complaints, however, as it included other work, and the going to and coming from his home at meal times, etc.

During 1901 we received and attended to the following complaints: Welsbach lamps, 554; freeze ups, 126; miscellaneous, 2,216; total, 2,896, or an average of 9½ complaints daily, leaving out holidays and Sundays. These complaints did not require the entire time of one man each day.

The return postal card feature, which Mr. Frueauff recommends so highly, has been in use by our Company during the past 3 years, and it has proved conclusively to be the best feature of our entire method.

In conclusion, I would state that ou rexperience at Madison during the past 6 years has demonstrated beyond a doubt that the adoption of systematic methods for handling complaints (whether they be real or imaginary ones) is absolutely necessary in order to obtain the best results, and we firmly believe that the cost in dollars and cents will bring a larger return than double the amount invested in any other manner, and at the same time insure the goodwill of the public to a great extent.

Discussion.

Mr. C. S. Ritter—Mr. President, I think there is nothing in either one of these papers covering the method of filing complaints. In Detroit we keep our complaints you might say on a loose-leaf, as it is received by the complaint clerk, and on the reverse side is the report of the man who does the work. This complaint is filed according to the street and number, and all additional complaints for the ensuing year will be filed along with it. At any time the complaint clerk receives a complaint she can turn to this file, which is very handy, and take out all the previous complaints. If she finds that the trouble is the same each time, of course, then it is up to the distribution department to remedy the trouble, whatever it may be.

The President—The point Mr. Ritter mentions is very important, especially in a large gas company. Below a certain size town you can keep track of the complaints with but little difficulty, but above a certain size it is never safe to depend upon remembering them. Has anyone else anything to add upon this subject? I consider it one of the most important subjects a gas company has to consider.

Mr. J. H. Maxon—At Coshocton we used slips perforated through the center, with a proper heading. The fitter who attends to the complaint writes his name on the top of the slip, tears off the bottom portion and returns it with the report of the work done. Both the top and bottom portions of the slips are numbered consecutively and filed in this way. The unattended complaints are kept on a stick, so that they are continuously before the fitter to show how many of them there are, and when attended to they are filed as per number. We found that having them in such shape was better than the return on the back, as you do not have to turn them over to see what the report is.

Mr. E. F. Lloyd—The system of handling complaints at Adrian, Mich., which has been in use only for about 4 months, is giving excellent results. I think there is no question about the necessity of giving all complaints immediate and thorough attention. We use cards of the standard size, 3 by 5, which are numbered according to the sample shown. The number to left is used only for the execution of the work:

(A.)

1	Complaint No. 1000	Name.
Received ..... Hour M.		Address .....
Issued ..... Hour M.		.....Complaint.....
Returned.....		.....
Received by.....		.....
Issued to.....		.....

Cause and how Remedied and Recommendations.

Postal.

the cards are in bunches on the desk. When a complaint comes in the name and address of the party and the complaint are entered on this card; also the time when it was and by whom received, to whom it was issued for execution, with the time and the time of its return. That card does not leave the office, as we want it for a permanent record. A manila duplicate issued to the fitter bears the name and address of the complainant and the trouble reported. After it is returned the man puts in the amount of time spent on the complaint, to-

(B.)

Labor.					Materials.	
Name.	Hours	Rate.	Amount.		Items.	Amount.
.....	.....	....	....	....	.....	....
.....	.....	...	....	...	.....	... .
.....	.....	....	....	....	.....	....
.....	.....	....	...	...	.....	....
.....	.....	....	..	....	.....	....
Charged.....	.....	....	....	....	Charged	....

gether with whatever may have been used in the way of material. The entry is made from this manila duplicate, which is usually much soiled, to the permanent card. Then a postal card is sent to the con-

(C.)

Adrian, Mich.,.....190

M.....

Our Mr.....*reports that he called at your*.....*yesterday in response to your order (our No*.....*) and that he*.....

.....

If there is cause for further complaint, please notify us at once, as we desire to have everything done to your satisfaction.

Very respectfully,

(Use Gas for Light and Fuel.) *ADRIAN GAS COMPANY.*

sumer notifying him of what has been done, and asking if he will let us know if there is anything further required in the matter. The name of the fitter is put on the postal card by way of fixing responsibility, and to cause him to feel a certain amount of personal interest in the affair. As you see, on the back of the card (B) we enter the name of the man, the amount of time put in on the work, and the value of the material. It frequently happens that a complaint is not merely something that you have to remedy at your own expense, for the workman may put up mantles, etc., but from this card any charge against the consumer is billed to him. After that the number used on the card originally is disregarded, and these cards are filed alphabetically. As a result, you have all complaints from any one party altogether over a series of years, and, as was remarked a few minutes ago, while it is more important in a large company than in a small one, we find that in a town of 30,000 people it is very useful to have a written report of the complaints received from any one source. We are thus enabled to remedy quickly such things as trouble in service, and the like, if we find such trouble is frequently reported from one source or district, which will be shown by the accumulation of cards against a single individual. In that way we are able to locate the source of the trouble by relaying the service or protecting it at some exposed point. During the past winter we found this to be a very useful feature. We are also able to keep track of the labor and material used with very little expense, which work is done by an inexpensive clerk. The cards usually pass under the eye of the manager, so that he may give any desirable special directions. If materials are used in the remedying of the complaint, they may be charged up to distribution and credited to merchandise account; if they are to be billed, they are charged to the consumer and credited to merchandise account. In that way we are able to keep track of our merchandise account and apportion our charges properly for the various expenditures in the different departments.

Mr. A. P. Lathrop—Mr. Lloyd's suggestions are very good, but I like the idea of filing these complaints away by streets and number, rather than by individual names. I think it is better, because most of the trouble comes not from the individual but from the location, and having them filed in that way you can the more easily locate and remedy the trouble.

Mr. Franklin, being called on by the President, said: I do not know that I can add anything to that we have already heard, with the exception of stating the system in vogue in Cincinnati. When we receive complaints they are recorded on a ledger, from that ledger slips are made out as to leaks, stoppages, or whatever the complaint may be. The slips are given to the men, and each man who goes out carries tools numbered with a seal, so that he can seal each meter, and when he leaves there he leaves a record behind him. In that way, we know just where to place our hands on the man who did the work, and ascertain exactly what was done. Then those complaints are filed away according to location.

The President—What do you mean by the seal, Mr. Franklin?

Mr. Franklin—We have a lock meter connection and that is sealed by the complaint man.

The President—You mean a lead bullet compressed by a tool?

Mr. Franklin—Yes; and sealed, showing the name of the company and the number of the complaint man.

On motion the sessions were adjourned until 2 P.M.

[To be Continued.]

[Prepared for the JOURNAL.]

Natural Gases and Observations Concerning Gas Lights in the Chinese Empire.

By ENGINEER.

In China they talk of "fire wells," and your correspondent visited some of the sections in which these wells are worked. There are natural gases in Chinese Thibet, as well as in those of Se-Tchouen. These gas wells are now, and have been for some years, furnishing quite considerable quantities of inflammable gas. The crudeness of the apparatus employed in working these gas producing wells will, of course, hinder the success of the project for some years. Foreign capital has lately taken interest in the most productive sections, and the indications for progress are far better at the present writing than ever before. Several sketches of the work in progress in the natural gas sections of China were made by your correspondent, and they are herewith annexed. The first one is a drawing of a section of earth in which an oil spring exists. The oil is in the base of the hole. Possibly the Chinese may have excavated the hole in a sand oil strata, and the natural results would be the gathering of the oils in the base. The oils would find vent through the fissure into the lower level and there remain. The principle is about the same as that seen in Asia petroleum oil fields, where the natives merely dig excavations 20 to 40 feet deep, by hauling the loose rock and earth to the surface in bamboo buckets. After the oil bearing strata is reached the hole is deserted for a few days, at the end of which time the oil in the surrounding sands oozes into the hole where it may be dipped out. This idea is developed in the gas wells. Sometimes, however, natural caves form, and the oil collects within. Often there are pockets in the hill sides adapted to these purposes. In either case, the gases rise from these confined oils, and provisions are made to get these gases and store them. When the Chinese discover an oil pocket like that shown in Fig. 1, a pipe is usually put into the boring, as at *C*, the pipe being marked *A*. This pipe is usually a cement stuff of native manufacture. The idea now is to tap the gas chamber. The oil rises up to the opening of the lower end of the pipe and the gas cannot escape that way, so a smaller pipe is run down, as at *B*, and means provided to control the passage of gas through this pipe to the retaining device at the level of the earth.

Tapping a Pocket.—One may see the Chinese prospectors about the fields tapping different sections on hopes of reaching a paying pocket. All kinds of drilling tools and devices are used for this purpose, some of which are very crude in design and make. The Chinese labor is cheap, however, and nothing is thought of devoting a whole day to some trivial occupation. In Fig. 2 is given an illustration of some of the operations along this line. The different stratas of the soil are seen, and below them are the oil bearing rocks and sands. The oil chamber is formed at *E*. The oil sends forth its usual volumes of gases, and these gases must find a place in an adjoining reservior or pocket, or escape through the fissure of the earth to the surface. Sometimes the latter happens and the course of the gases is something as represented at *F*, where the lines extend upwards through the earth to the crust, emerging at *G*. The Chinese oil well and gas well engineers soon find traces of these surface indications of confined gases and they proceed to locate the storage chamber. This they do with the boring device *D*, which is little more than a sharpened pipe which is driven into the earth for short distances very readily. When the main chamber is located, the proper pipes and native devices are employed to draw out the gas for transportation to the point of use.

Utensils.—Reference is next made to some of the crude apparatus used by the workmen. Fig. 3 represents a bamboo bucket, which is handmade of hollow tubing, and fitted with the handles as shown. Fig. 4 is a little scoop used at the wells, made with cocoanut shell for the bowl fixed with a wood handle. Fig. 5 is a form of wood rake made by putting a row of bamboo pins into the crosspiece. In Fig. 6 is shown a type of dipper in use at the oil and gas wells for dipping purposes, made of a section of bamboo tubing fitted to a handle. Fig. 7 is the design of rope and wheel usually employed at the wells. The practice is to have the wheel on a beam over the opening to the well. The rope passes over the groove in the wheel and downward by carrying the hook *I*. The wheel is marked *H*. The hauling rope is *J*, by which the natives are enabled to haul up buckets of earth or rock in clearing out a passage for the putting in of pipes, etc.

On the Surface Well Plan.—I noticed that many of the miners operated with surface wells. A location is first found and the surface well is put in, as in Fig. 8. Considerable labor is necessarily expended on these surface wells, because of the need of walling. Often the well is sunk 30 or 40 feet in depth and it has to be walled up. The digging of the well is entirely with the hand devices. Crude tools are employed. Buckets attached to ropes are let down and wound up again on a hand windlass. Now and then one sees a singular form of power engine for doing this work, but most of it is done by manual labor. After the surface well is sunk to proper depth, and walled up with stone or masonry, the process of sinking the tube begins The surface well portion is marked *K*, the tube *L*. This tube varies in character. Sometimes the tube is metal, and sometimes wood. I saw some masonry or pottery tubes, made of pieces of material shaped from clay and hardened. The hole is bored for the tube very much after the Chinese fashion of boring wood. The first few feet are practically cut out with drilling devices, and after that the earth has to be removed as fast as loosened, by different forms of sand pumps, lifting tubes, etc. Often the earth or stone at the base of the boring is loosened and then a cylinder is lowered, the bottom of the interior of which is cone shaped. This cylinder is lifted and dropped alternately upon the base of the hole, with the result that the debris works into the tapered sides and is held there by a closing trap, which trap admits material into the cylinder, but prevents it from passing out again. When the tube is filled, it is lifted out and the con-

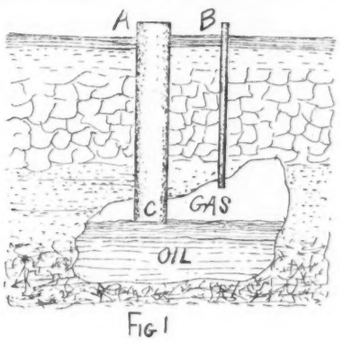


FIG 1

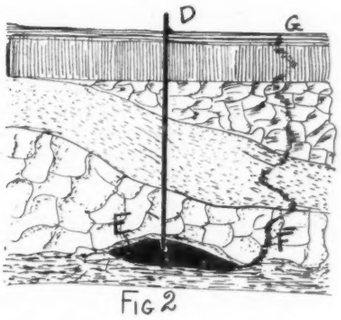


FIG 2

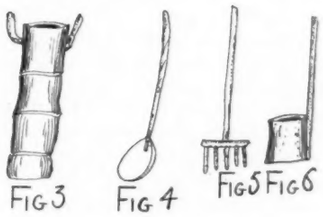


FIG 3 FIG 4 FIG 5 FIG 6

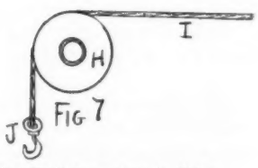


FIG 7

Gas Well Operations in China.

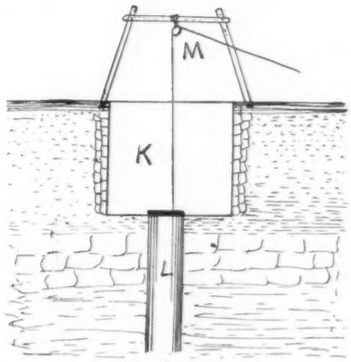


FIG 8

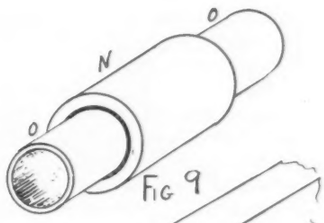


FIG 9

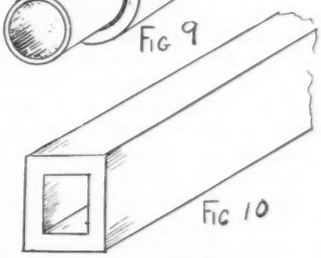


FIG 10

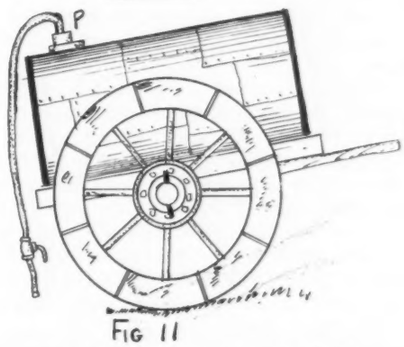


FIG 11

Apparatus Used at the Chinese Gas Wells.

tents dumped out on the heap, and the operation repeated until the proper depth is attained. The manner of rigging up a derrick is shown at *M*. The derrick is usually a crude combination of timbers, put together rather frailly, as may be judged by the derrick in the cut. There is a rope passed through a pulley block fixed to the cross piece of the derrick, and this rope is used for all boring and lifting purposes in connection with the working of the boring. In course of time the gas chambers are tapped, and then the gases pass up through the tube to the surface where they are received into the proper pipe system for conveyance to point of use.

Chinese Pipe Systems.—In Fig. 9 is shown a common style of Chinese piping, which is quite effective, in that it is staunch. It is molded from clay. The mains are represented by *O*, *O*, and the sleeve for effecting the union is *N*. The sleeve is made of the same material and is slid over the ends of the mains and cemented thereon by some of the clay. When the clay hardens, a tight union results. I saw that bamboo pipes were in use in places. These bamboo pipes would not suffice for carrying gas unless they were lined with a cement stuff, and clay is usually employed for the lining. The joints and the exterior of the pipes are often freely coated with the clay, and the clay is allowed to bake in the sun or by exposure to artificial heat.

Block Pipes.—Some of the Chinese piping at the gas wells is made like that sample shown in Fig. 10, in which the construction is entirely of wood. The log of wood is selected and bored by cutting and burning until the required size hole is secured. Then the pipe is squared off with native axes and other tools, and the affair is ready for service. The joints are made by connecting with wood sides, the same being plastered up with a cement of Chinese mixture. Recently metal pipes have been imported and used with good results.

Portable Tank.—A portable gas tank of Chinese design is shown in Fig. 11. The tank rests upon the body of the cart, which is a two-wheeled affair. The tank is made of sheet metal and fitted with a vent at P, to which a rubber pipe is connected. The tank is filled with gas and the gas conveyed to any desired point. The Chinese oil well and gas engineers use these carts for conveying oil as well as gas.

A Comparison of Oil and Gas Lamps.[1]

Under the general title of "Mineral Oil as an Illuminant," Professor Vivian B. Lewes is giving a series of lectures at the Petroleum Institute, Bevis Marks, E.C. The first was delivered on March 10th, when Dr. P. Dvorkovitz presided. The lecture on this occasion was divided into 4 distinct parts: (1) The history of mineral oil lighting; (2) oil lamps and their photometric value; (3) vitiation of the air of rooms lighted by oil compared with other methods of illumination; and (4) danger of oil lamps.

At the outset, Professor Lewes referred to the importance of competition in commercial progress. This, he said, is exemplified in the case of both coal gas and oil illumination; for, in spite of the competition of electricity, both are gaining ground instead of losing it—in fact, both in the coal gas industry and the mineral oil industry, we are really

1. *Journal of Gas Lighting.*

only on the confines of their usefulness and prosperity. The last century has altogether been a century of illumination; and has done more in giving us the power of artificial light than the long ages that went before. The history of mineral oil, he supposed he might say, commenced really in 1781, when the celebrated patent of Lord Dundonald was taken out for the ditillation of shale for the production of mineral oil—the shale naphtha which was so produced being used in a crude form of lump. In 1820, coal gas was just beginning to make its way. Naphtha was then distilled from the coal tar, and it was also employed for illumination in lamps which are of the greatest possible popularity to-day among costers. The outdoor naphtha lamps of to-day are the same as those made in 1820 by Read Holiday, of Huddersfield. From 1820 to 1847 may be looked upon as the period of incubation; and the latter year may be termed the start of the petroleum industry, when the Scotsman, James Young, had his attention called to a small spring —not much more than a trickle—of oil which was found in one of the workings of the Riddings Colliery close to Alfreton. From this point, Professor Lewes brought the historical part of his lecture to the present day—including in it information as to the progress of the oil lamp, from the time of the first American patent in 1859. He next interested his audience by explaining the methods by which the oil lamp develops its light.

Approaching the economical question, which is really the side governing the true future of oil, Professor Lewes said: You find you have to take into consideration the performance of the oil lamps—the amount of light they will give, and the amount of oil they will consume. I think we are perfectly willing to admit that there is one thing common between the vendor of oil lamps and the electrical engineer. If you go into the streets, and look up at the blinking electric lights, you will find the electrical engineer will tell you they are of 1,000-candle power. You will, however, find they are of 200-candle power; but you dare not mention that to the electrical engineer. The same amount of leniency is not extended to coal gas. It is hounded from pillar to post; and here in London you have some 24 or 25 stations where the gas is daily tested, and where the smallest falling off in the illuminating power of the gas, or the smallest appearance of impurities in it, leads at once to your lugging the Secretary of the gas company up, together with the "morning drunks," to the nearest Police Court. In this way, the results obtained, as far as the standard goes in coal gas, are fairly constant. The vendors of oil lamps are lucky in having no fixed standard of illumination to attain. No one has yet taken the trouble to make a standard in order to get something by which oil lamps could be tested, and really fix their illuminat'ng power as compared with the best that oil can do. The oil lamp manufacturer is able to endow his oil lamps with any fancy figures of illumination he pleases. They usually speak of them giving 50 or 60 candles; but you do not really find any ordinary lamp that does give that. The duplex lamp gives from 20 to 30 candles; and if it gives over 30 candles, then it is doing uncommonly well.

I think, when we approach the subject of the performance of the oil lamp, that we should first of all look at the ordinary figures, and then we may take some practical illustrations of what has been done by oil lamps. Dr. Boverton Redwood has made careful tests with regard to the light given by oil lamps; and the figure he has put forward is that a really good duplex burner, with a consumption of 50 grains of oil per hour, will give 1 candle illumination, and with a good circular wick burner, and 45 grains consumption, will give 1-candle power per hour. [Professor Lewes then referred to the tests made by himself with a number of lamps such as are in common use, and with both American and Russian oils; and the tests, in many cases, bore out Dr. Boverton Redwood's figures.] Among other remarks of the lecturer were these: Some lamps are not fitted for the consumption of Russian oil. Take the 60-line Veritas circular wick lamps for example, there is considerable difference between them in the consumption of American and Russian oil—64.5 grains of American oil per candle power per hour, and 112.5 grains of Russian oil per candle power per hour. Some lamps, however, are better adapted for the consumption of Russian oil, and in them it practically comes up to the American. In the Duplex lamp for instance, I got a rather better candle power from the Russian oil than from the American. Then we have Dr. Redwood's authority for saying that, when Russian oil is burned over a long period, it approaches in its results more nearly to the American. However, we may take it that 50 grains of oil per candle per hour is a convenient basis.

Taking a fair average lamp oil which has a specific gravity of 8, inasmuch as you have to pay at the oil shop 8d. per gallon for good forms of oil, this is equivalent to oil at 1d. per pound. Now, if you get 1 pound of oil for 1d., and the candle of illuminating power for 50 grains, then we shall get from that pound of oil—7,000 grains, divided by 50, equals 140 candles for tbe penny. Now how does this compare with coal gas. With coal gas, the light developed is absolutely dependent upon the burner in which it is used. Taking flat flame gas burners, you find that, according to the amount of gas they consume, so is the candle power which they emit per cubic foot of gas. If we take a No. 7 burner, it will be found that it will give 2.4 candles per cubic foot of gas; and if we take a No. 4, it will give 1 7 candles, perhaps rather less. But taking the whole range of the flat flame burners from No. 4 to No. 7, a fair average is 2 candles per cubic foot. With the London standard argand, and 16-candle gas, 3.2 candles per cubic foot; 3 candles per cubic foot being a fair average. But coming to regenerative burners, a much better duty is realized. An average of 7 candles per cubic foot can be obtained with them. Ten candles can be got; and when great attention is paid to the regenerative burners 10 candles is a fairly common duty. You can get up to 12 candles; but then you can only use the lamp a few weeks, owing to the intense heat. Then, finally, the gas can be burned in that requirement of modern day gas lighting—the incandescent mantle; and, if I take a fair average for that, I shall not be far wrong in saying 17 candles per cubic foot of gas consumed. At the present time, you can take dozens of mantles and test them up to 20 and even 22 candles; and you will find a considerable number of them drop in light very rapidly, with the consequence that you will find quite as many twelves as twenties. We may therefore take 17 candles as a fair average for iucandescent mantles. Now, supposing we take coal gas at 3s. per 1,000 cubic feet—I should be sorry to say the Gas Light and Coke Company are going to descend much below 3s. in the immediate future—and the figures already mentioned as representing the duty obtained per cubic foot of gas consumed, we find the candles we get for 1d. will be: By the incandescent gas mantle, 470 candles; by the regenerative lamp, 221 candles; by the oil lamp, 140 candles; by the argand gas burner, 83 candles; and by the flat flame burner, 55 candles. You have there a fair comparison—not made by straining figures in any way. The comparison between the economical value of oil and coal gas shows that, with the modern forms of burner, oil cannot compete with coal gas; but with the flat flame and the argand, the oil lamp has all the advantages of economy. Oil shows an enormous advantage over either the argand or the flat flame; but it goes down at once before the regenerative lamp and incandescent burner. After all said and done, however, this is not a serious matter, because the people who use oil lamps are not the people, as a rule, who will ever use mantles, and certainly would never use a regenerative gas lamp, owing to the high initial cost of installing that luxury. Now you see in this way you have the eoonomical side and character of the oil lamp fairly established.

Let us see if there is anything else which we can find which places the oil lamp in front of other illuminants. Examining carefully the conditions in our suburban houses, we find in many drawing rooms the candle and the oil lamp installed in preference to coal gas. If you ask your hostess the reason for this, she will tell you that the candles or the oil lamps vitiate the air so much less than the coal gas. When you come to examine the truth of this statement, you find the following are the facts: We may take the composition of the oil as being about 86 per cent. carbon and 14 per cent. hydrogen. From this, the thermal efficiency of the oil can be fairly well arrived at, and one can, from the composition of the coal gas and the composition of the oil, arrive at the products of combustion given off by both. You would find, for every candle of light which you obtain by the combustion of the oil, on the basis of 1 candle for every 50 grains of oil consumed, 0.24 of carbon dioxide and 0.18 of water vapor. Then, for gas burners, the flat flame gives off rather more carbon dioxide (0.26) and 0.67 of water vapor; the argand 0.17 of carbon dioxide and 0.45 of water vapor; the regenerative lamp, 0.07 of carbon dioxide and 0.19 of water vapor; the incandescent lamp 0.03 of carbon dioxide and 0.08 of water vapor; while the innocent sperm candle, which is looked upon as the emblem of all purity, gives 0.41 of carbon dioxide and 0.41 of water vapor. Though the oil lamp has a slight advantage over the ordinary gas flat flame as regards carbon dioxide, yet the carbon dioxide from the oil flame is greater than from any of the other form of gas illumination. Inasmuch as it is carbon dioxide upon which the sanitary authority always bases his ideas as to the fitness of an atmosphere for respiration, you will find that, upon that basis, the innocent candle would be the worst offender of all, the oil lamp would come very nearly next, and then the gas, according to the way in which it is burnt, shows far better results. But, you will say, in a room lighted by oil, one does not feel the heat so oppressive as in a room lighted by gas. Why is this? In the

first place, there is a craving for more light; the more you have of it, the more you want of it. The craving grows upon one to an extraordinary extent. Now, when coal gas is laid on to half-a-dozen burners in a room, generally those burners are all alight at once; but when burning oil, only 1 lamp is, as a rule, going at a time, and that on the table quite near you. Again, when using candles, only one or two are placed on the table by your side. But with the candles, you are content with a small amount of light. When using the oil lamp, you get a larger amount of light; and with coal gas, a larger amount still.

This is one factor. Another, and a far more important one, is this, that you find the real impurity in air which renders that air unfit for respiration is the organic matter which comes off with the carbon dioxide from your lungs and skin while you are inhabiting the room. But it is exceedingly difficult to estimate the organic matter, and so the sanitary authority takes the carbon dioxide to show the fitness of the air. Take the case of gas burning from a chandelier. The products of combustion leave the flames at nearly the temperature of the flame itself, and rise up and go to the ceiling space; and, if these products are not rapidly carried away, they fill the whole top of the room down to the level of the gas burners. Now, the organic products from your body and breath are coming off at a temperature of not more than 98° F.; the temperature of the products of combustion of the gas are coming off at a far higher temperature; and the hot layer at the top of the room is above the temperature of the products which leave your body. What is the result? You get the ceiling level of the room, so far as the products of your body go, brought down to the level of the chandelier. You have above that point air so hot that the products of your body cannot penetrate through it. If, instead of using gas in this way, there is an oil lamp on the table, it will be found that the lamp will give off its products at the table level, also at a very high temperature. But those products go upwards in one stream, and get fairly cooled as they pass up through the much greater travel of air. The result is that these products, as they collect at the top of the room, are far less heated. Therefore the products from your own body are carried up much nearer to the ceiling, instead of being at a much lower level; and this has a great deal to do with the feeling of oppressiveness that one gets in a room where gas is used.

It will be seen that the oil lamp, although it gives carbon dioxide which is very nearly as large in amount as that given by the flat flame, yields an amount of water vapor which is enormously smaller. Now, when the air of a room gets saturated with water vapor, as it does very soon when using gas flames, it is found that the water which is always being drawn off the surface of your body as perspiration gets checked, and the amount of water vapor given off from your body is very much reduced, owing to the air already having got so much water vapor that it does not require to draw more from your body. In this way you have a certain check to the actions of the body; and the oppressiveness of the room gets greater.

It may be urged that there is a certain amount of sulphur in coal gas. The quantity in highly purified coal gas is, however, so small that, by the time it is burned at the flame, and the products diluted by the air, the amount of sulphur compounds have very little practical importance indeed. After all, paraffine is known not to be always free from sulphur itself; so that it is just as well not to dwell too much upon that point.

However, you find all these factors taken together really render your oil lamp in a room less oppressive than the gas flame, because you are doing with less light, you are getting a less accumulation of hot air above, and you are not getting nearly so much water vapor produced.

Now, turning to the amount of heat which the flames give off, there again you can readily arrive at the relation between the heat developed by the oil flame and by the gas flame. Where a big oil burner is used, the heat developed is enormous; and if you take one of the finest oil lamps—a big "Veritas" lamp, with its 60-line burner and large flame—you have a result which, in a dwelling room, would be akin to converting the room into an oven. It might be most acceptable in a country chapel on a winter night; but in a dwelling room it would be impossible. This gives a limit to the size of your oil lamps. Comparing the heating effect of oil lamp and gas flame with the former, you get 336 British thermal units per candle, and with the flat flame 310. This is perhaps a little low for the flat flame. The thermal value of the London gas is as nearly as possible 650 British thermal units. Here we have our flat flame taken as 2 candles per cubic feet; so it would make it 625 British thermal units. The heat which is generated in the oil flame has to convert the oil into gas; and a certain amount of heat is used up in this way; so I think it fair to say that the oil flame and the flat flame are just about on a par for their heat.

While one is making these various reflections on oil and gas, there is one thing that must pass through one's mind. It is this, that we have only had coal gas taking the enormous strides forward in the regenerative and incandescent burners (which have placed them ahead of oil) in the last 15 years; and if these factors which have put gas light so far ahead can be applied to oil lamps, why should not the oil lamp show an increase in utility? In one of my later lectures I shall show you that this step has been very nearly practically realized. You can, by adopting the incandescent mantle to the oil lamp, get very fine results; the only thing is that you have to obtain the form of oil lamp which will behave itself with decency under all conditions. And you will find there are various ways in which these advanced methods of burning oil can be applied in a highly satisfactory way.

We are told by the half-penny press that these petroleum lamps cost one life a day. There is no doubt there are an enormous number of accidents; but when we come to examine them, 80 or 90 per cent. of them are accidents which ought not to happen. If, in the first place, you could sweep away at one full sweep all the cheap garbage which is sold in the name of lamps in poor neighborhoods—things which are unfitted for burning mineral oil in, you would find one-half of the accidents done away with. Professor Lewes proceeded to deal with the numerous other small factors which go to make up a general run of lamp accidents; and he ended his lecture by saying that most of these are factors which could easily and readily be abolished. Even if the more glaring of them were done away with—such as the accidents from cheap oil lamps, the moving and improper methods of extinguishing lamps—it would be found that the death roll for mineral oil lamps would come into decent comparison with accidents from other forms of illumination.

Dr. Dvorkovitz, in proposing a vote of thanks to Professor Lewes for his interesting lecture, pointed out that the oil lamp stood very well in the comparison with the argand and flat flame gas burner. After all, incandescent gas mantles and regenerative lamps were not in general use in this country; and most gas consumers still used flat flame burners. It was quite true, it would be most important if a standard for oil lamps were introduced. He was quite sure, if the Government did not insist on a standard of illuminating power and purity for gas (which was supplied with such perfection by the gas dompanies), the supply would be exceedingly inefficient. He was confident that the chief oil-lamp accidents were due to the non-existence of a standard lamp, and to the presence of the cheaper lamps.

The vote was heartily accorded.

Professor Lewes, in responding, said he quite agreed with Dr. Dvorkovitz that a standard for oil lamps would be an excellent thing to introduce to get greater equality in the lighting power of the lamps, and to give the lamp makers some standard to work to. One could not imagine any great industry, such as the oil lamp industry had become, working without any guide, excepting the guide of public opinion. As it was, most makers were rather in the dark as to what they were really aiming at; and he was sure every lamp manufacturer would be only too pleased if some lamp standard were devised for him to work to. A standard lamp would have nothing to do with accidents; but a little common sense brought into the use of oil lamps would do more than any amount of restrictions.

Soldering Acids and Fluxes for the Apprentice.

"Belmar," writing in a recent issue of *The Metal Worker*, on the topic named in the heading, said:

A boy who had worked at the business but a few weeks when asked how he was getting along rattled off the following:

"Lead tarnishes very quickly. Cleanings for wiped joints should be covered with tallow as soon as shaved. Tallow keeps the air from tarnishing the cleaned part and does not interfere with the solder sticking to the lead where it is cleaned. Lead should not be cleaned long before using or soldering it. When cleanings are to be soldered immediately, powdered rosin makes a good flux; it seems to have the power of making solder unite with lead, just as though it had been melted together in a pot instead of being melted on with an iron or by pouring. A particular feature of all soldered joints is to have the solder and the cleaning perfectly clean. No joint is safe or permanent unless both are clean. Rosin will not do for wiped joints; it 'blows,' smokes and sticks to the cloth, stiffening it and unfitting it to wipe with. Ordinary sperm candle 'tins' on lead, brass and copper; it tins under the soiling on wipe joints, too, so it is not good to cover wipe joint cleanings. Raw muriatic acid (commercial) works well on new and old galvanized iron.

It must be wiped and washed off immediately after soldering or it will eat into the iron and injure the pipe. Galvanized iron boilers and pipe cannot be soldered well, and if at all, the galvanizing must be filed off so that the solder will take to the iron all around and over the leak. "Cut" acid (muriate of zinc, made by putting in muriatic acid all the zinc it will dissolve) works well on new galvanized iron. Raw acid is often used on old galvanized iron, because it cuts the dirt off easily. Acid diluted with water is used on galvanizing iron and brass, too, but 'cut' acid must be used when plain filed iron is to be tinned and soldered. Plain iron ends tinned with acid are not good for solder. Ever so little zinc affects the solder. Brass cleanings should never be tinned by dipping into wiping solder; brass contains zinc and the solder melts some of the zinc out of the brass, then the brass is not so good and the solder is ruined for wiping purposes. A face put on a soldering copper by rubbing it in rosin on a brick, after filing, will stay longer than one put on with acid or sal ammoniac."

The boy says "The man I work with told me this every day until I could remember every word or any part of it, and said that such knowledge would get handier every day, and that if there was anything wrong in it I would find it out soon enough."

Unpatentable.[1]

No engineer who has the good of his profession at heart can fail to be cheered by a manifest tendency at the present time on the part of a large proportion of his engineering brethren to pay more attention to neglected features of their work. The same tendency has been manifested among mechanical, electrical and civil engineers, although it has been most developed among the last for a number of years. At a recent gathering of engineers of reputation in several special fields this subject was informally discussed and the general opinion seemed to be that civil engineering had the best general development because of the old time aversion of its followers to patenting their devices and improvements in plant and methods of working. This is a somewhat surprising view to take of the result on engineering of the valuable patent acts of the country, yet it is worth while for a young engineer to think about it.

It goes without saying that no manufacturing house cares to develop a new device and educate the public to its merits if a competitor can take up its manufacture when it has been brought into favor, and market it without the fixed charges resulting from its original design and introduction. Our system of patent rights and trade marks prevents such an injustice, and has proved an incalculable boon to the development of industry. It has had this important result, however, in which some bright, young engineers will soon find a source of much profit. The manufacturers of patented appliances have been led by sound business principles to make their products familiar to all users by every resource open to that most resourceful man, the advertising manager. Not only by advertising in class publications and by trade literature, but also by skilfully prepared papers before professional societies and by costly exhibits at fairs, every merit of his products is repeatedly, almost continuously, brought before his particular portion of the purchasing public. His ideas have been unconsciously absorbed by so many people who consider themselves unbiased in their opinion, that the broad field of the unpatentable in engineering practice has been neglected. This is but natural and in no way a reflection on the ability of the manufacturers, or on the character of their goods.

For example, take the field of power transmission. We have excellent specialists in electrical transmission and in rope transmission, but how does the account stand with the old leather belt? Only a few years ago the rules of thumb established by practice were considered all-sufficient. Rankine's theoretical deductions concerning belting in general were held to be the last word possible on the subject. But unfortunately a German specialist went to work on the subject and proved, to his own satisfaction at least, that the theories of Rankine could be extended. He was laughed at and so he conducted a long series of practical trials. Now he does the laughing, for in his shops he is running belts at speeds that the old rules would declare impossible and he is transmitting power with a given belt which no one would attempt before. Another instance of the lack of definite information about the everyday things of engineering came up at the recent meeting of the American Railway Engineering and Maintenance of Way Association. It relates to mortar, a material so well known and used so many years that it is natural to expect an agreement of opinion concerning its manufacture. A discussion arose concerning what was meant by the expression "so many parts of cement to so many parts of sand" in a mortar.

1. *Engineering Record.*

One speaker stated and the others apparently agreed that parts by volume were meant, but just what kind of volume proved to be uncertain in respect to the cement. One engineer held that it meant the volume in the original package, another the volume when in a loose condition out of the package, and a third the volume when dumped from the sacks into a barrel used for measuring. Anyone who has seen the manner in which a skilful foreman on a contract can make a barrel of cement increase and multiply when he has a good chance to measure it outside the original package can appreciate what a difference there is between these interpretations of a common engineering term. Many pages of similar instances could be cited, were they needed, to emphasize the point that the careful study of apparently well-established features of engineering is a field in which much credit of a distinctly profitable nature can still be achieved.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

MR. CARL H. GRAF has resigned the position of engineer of the gas division of the properties of the Gas and Electric Company, of Bergen County, N. J. This move on his part was prompted solely by the desire and practice of the present managers of the concern to get as much as they can for nothing.

MR. WILLIAM R. SNEAD, President of the Snead & Co. Iron Works, Jersey City, N. J., died at his home in New York City the morning of March 27th. He was a brother of Mr. Udolpho Snead, President of the Louisville (Ky.) Gas Company.

LAST week we noted that Mr. Wm. E. Steinwedell had resigned the position of Superintendent to the Belleville (Ills.) Gas and Electric Company, to accept a responsible position with an Eastern Company of importance. Mr. Steinwedell has become associated with the Western Gas Construction Company's engineering department, with headquarters in the Company's general offices at Fort Wayne, Ind.

THE proprietors of the Springfield (Mass.) Gas Light Company, who wished to construct a gasholder on their West State street property, having been denied the privilege, because of the objections of the aesthetic residents of that section, have arranged for the construction of the vessel on the Company's West street site. Mr. Fred. Mayer, of Bartlett, Hayward & Co., who will construct the holder, is perfectly satisfied over the substitution of the grounding bottom.

THE manipulators of the scheme for the placing in Terre Haute, Ind., of the works of the Terre Haute Gas and Pipe Line Company, seem to be in trouble. The franchise was granted them 2 years ago, with the proviso that the works should be in operation to-morrow. Not a thing has been done in good faith in the instance of the application, and its effect is likely to be non-operative, for the authorities are seemingly satisfied that the Citizens Gas and Fuel Company, which now covers the demands of the residents for gas in any sort of shape, is up to every requirement of the people who live in Terre Haute.

THE parties who were behind the project for the establishment of a Consumers Gas Company in Scranton, Pa., seem to have experienced a set back, through the veto of their application for the right "to lay pipes in the streets, avenues, courts, alleys, walks and public places in the City of Scranton, for the distribution of gas." City Recorder Connelly who has the right to say when the Council is wrong, in a short, sharp veto, put out a very pertinent paragraph to the effect that the franchise, between the time of its original introduction and final passage, displayed no amendment changes that had been agreed upon during the history of the comment on the application. Good for the Recorder.

THE Waterloo (Iowa) Gas and Electric Light Company has made a most advantageous sale of property owned by it to the Burlington, Cedar Rapids and Northern Railroad Company. Mr. Josselyn's judgment on the purchase of this property some years ago would thus seem to be vindicated, although many thought he was not in "good mind" when the tract was acquired.

THE Board of Gas and Electric Light Commissioners has rendered an opinion confirming the decree of the Board of Selectmen, of Clinton, Mass., that the Bigelow Carpet Company, of Clinton, had the right to extend its wires for the conveying of electric currents to and through the streets of the city. It was a knotty subject to handle, but the decree of the Commission seems to be in line with the verdicts of that body, that equal vested rights are entitled to fair protection.

THE proprietors of the Citizens Gas Company, of Anderson, Ind., have under consideration the construction of a plant to manufacture gas, wherefrom to supply their patrons next winter. The supply of natural gas, which has heretofore been obtained from the Fort Wayne Company, failed so rapidly last winter that the Anderson folks are anxious to place themselves on the independent seat.

MR. F. H. SHELTON and his friends have secured complete control, through purchase, of the rights and plant of the Media (Pa.) Gas Company. The Directors representing the controlling interest that have been named to the new Board are: C. R. Miller, J. D. Shattuck, F. H. Shelton and S. Haigh. Those who keep their eyes on the lines that are being inscribed on the current pages of time will readily know that the Philadelphia Suburban Company is becoming a high pressure concern.

THE manufacturing plant of the Carlisle (Pa.) Gas and Water Company is to be rebuilt, and the reconstruction is to cover the Company's main system as well. Both divisions of its real property were quite up to the needs of the decision reached.

MR. JNO. C. KNIGHT, Manager of the Peoples Gas and Electric Company, of Oswego, N. Y., says that Oswego may not be fairly regarded hereafter as a "Kerosene oil town," even in the instance of gasoline cookers. The Company, through Mr. Knight's well sustained efforts, has placed 300 gas ranges within the last 18 months, and his fair boast is that within a twelvemonth the number will be doubled.

THE gas franchise for Boise City, Idaho, the granting of which to Messrs. Burrows, Baker and others was reported in the JOURNAL for last week, specifies that the proprietors of the concern shall pay into the city treasury 1 per cent. of the gross receipts for the first 5 years of its life, and 2 per cent. thereafter for its final estate, which is limited to 50 years. The conditions of the grant are, on the whole, extremely liberal. As an example thereof, we may quote from the ordinance that absolute work under the agreement must be commenced within 6 months of the signing of the grant, and that within a year the Company shall have placed 1 mile of distributing main.

CAPT. JOHN J. PHELPS has been elected to membership in the Board of Directors of the Gas and Electric Conpany, of Bergen County, N. J. The Captain does not know much about gas. Hence, his fitness for the place.

THE Council of Billings, Montana, has granted to Christian Yegen and associates, a franchise for the right to build and operate there plants for the manufacture and supply of gas and electric currents. The field is a limited one.

MR. E. A. PEARCE, a well-known plumber of Hackensack, N. J., succeeds Mr. W. C. Thomas as Treasurer and Manager of the Gas and Electric Company, of Bergen county, N. J. *Hodie mihi; cras tibi.*

GRANVILLE, Washington county, N. Y., wants gas. Messrs. Flood & Sherrill, of Sandy Hill, N. Y., declare that Granville's wants in that respect will be appeased by them. The place is a very small one.

PORT ARTHUR, Tex., is to have a gas plant. Mr. D. L. Stump, we understand, is the leading spirit in the projected enterprise. Under the tentative scheme a "greased wind" system is outlined, with Beaumont oil as the basis.

IT is reported that the gas, electric and street railway systems of Jackson, Tenn., have been purchased by a syndicate of St. Louis capitalists.

THE plant at Cadillac, Mich., is to be constructed under the supervision of Mr. Fred. W. Freese, of Bloomington, Ind. Mr. A. D. Cressler, of Fort Wayne, Ind., is Vice-President of the Company.

DURANGO, Col., is to have a gas works. The main parties to the proposition are the proprietors of the Boston Fuel and Coal Company.

MR. L. A. SHERMAN has been named to the vacancy in the Board of Directors of the Port Huron (Mich.) Gas Company, caused by the death of Mr. James Goulden.

MR. WM. H. BAXTER, who served the Petersburg (Va.) Gas Light Company faithfully and successfully in important positions—as Superintendent, Engineer, Secretary and Treasurer—since 1856 has retired from active work. The Company, on his retirement took suitable action expressive of its appreciation of the good work that he had done for it.

THE proprietors of the proposed Gas Company for South Deerfield, Mass., who assert that a works will be built there this spring, have named the following officers: President, A. A. Jewett; Treasurer, John H. Ockington; Clerk, Albert Beaulac; Supt. E. A. Frary.

THE Bridgeport (Conn.) Gas Light Company will extend its mains this summer to the outlying town of Southport.

THERE is talk of an opposition company for Norfolk, Va., but there is no seeming necessity for the placing of such a concern.

MR. T. H. STUART, of Waco, Tex., under date of March 26th issued the following circular to the members of the Southwestern Gas, Electric and Street Railway Association:

As formerly announced, the Southwestern Gas, Electric and Street Railway Association will hold its fourth annual meeting in the city of San Antonio, on the 18th to the 21st of April. The local arrangement committee are making extensive preparations to take care of the delegates and their friends. It is well assured that a large attendance will be on hand and indications point to a very interesting and successful meeting. Both the business and social sides of the meeting are being carefully looked after, and San Antonio, with its known hospitality, and with Col. E. H. Jenkins as host, will surely make the fourth annual meeting of the Association far ahead of any of the previous meetings. A good business programme has been arranged. After this has been carried out, the delegates will be presented with the social side of the programme, one of the most prominent features being a trip to Mexico, giving those in attendance an opportunity to go through this historical old Republic, visiting the principal places of interest at a very small cost, and with the advantages of having a home party with no objectionable characters, as it is understood that no one is to be taken into the excursion who is not agreeable to the delegates or their friends.

Special railroad rates have been secured to San Antonio for the convention, all roads selling round trip tickets, on the 17th, for trains arriving at San Antonio the morning of the 18th, at a rate of one fare, plus 10 per cent. These tickets are limited to the 24th, but parties desiring to take advantage of the trip to Mexico can have their round trip tickets extended, giving them ample time for the trip.

The itinerary for the Mexican trip, which contemplates leaving San Antonio at 9 o'clock, the morning of April 22d, is as follows:

Special train service from Laredo to Mexico City for party of 45 or more, via International and Great Northern and Mexican Central Railways:

Leave San Antonio	9:00 A.M.	April 22.
Arrive Laredo	3:30 P.M.	"
Leave Laredo	3:50 P.M.	"
Arrive Monterey	10:00 P.M.	"
Leave Monterey	1:00 P.M.	April 23.
Arrive Saltillo	4:00 P.M.	"
Leave Saltillo	9:00 P.M.	"
Arrive San Luis Potosi	7:00 A.M.	April 24.
Leave San Luis Potosi	1:00 P.M	"
Arrive San Miguel	5:00 P.M.	"
Leave San Miguel	7:00 P.M.	"
Arrive Toluca	6:00 A.M.	" 25.
Leave Toluca	1:00 P.M.	"
Arrive City of Mexico	4:00 P.M.	"
In Mexico city		April 26.
In Mexico city		April 27.
Leave Mexico city	7:40 P.M.	"
Arrive San Antonio	12:10 Noon	April 29.

Comparative cost of trip of 7 days, in accordance with foregoing itinerary, including railroad fare, Pullman, hotels and meals, and street cars where stops are made $50.00

Low rates will also be on for Monterey or other points.

Those desiring to avail themselves of the trip to Monterey only, leave San Antonio at 9:00 A.M. via I. & G. N. and Laredo, reaching Monterey same date, 10:30 P.M. Returning, leave Monterey 10:50 P.M., arriving San Antonio following day, 12:10, noon. Comparative cost of the trip to Monterey and return for three and one-half days, including passage each way, two days' stop at Monterey, railroad fare, Pullman and hotel, about $18.50, U. S. currency.

On the trip to Mexico on special train service Pullman cars are vacated at stops, giving party advantage of minimum charge, accommodations to be paid for from point to point.

This excursion will be in charge of competent parties who are thoroughly acquainted with the Republic of Mexico, and who know all the principal features and places of interest.

Those desiring to take this trip should send in their application to the Secretary at once, or to E. H. Jenkins, San Antonio, who is Chairman of the Arrangement Committee.

Don't forget the dates of the meeting: April 18th to 21st.

Any information relative to the Association meeting will be given with pleasure and promptness.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
MANAGER.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 32 Pine Street, New York.

MONDAY, APRIL 7, 1902.

The Market for Gas Securities.

The local market for gas shares showed good volume of trading for the week, and the transactions were completed at a substantial gain in values. Consolidated closed to-day (Friday) at 226¾ to 227½, although earlier in the trading, sales had been made at 228 or so. The stories about that which is to happen in the ultimate relation between Consolidated and Brooklyn Union will not down. Standard common and Mutual have been inquired for with some persistence of late.

Naturally enough, Brooklyn Union sympathized with the advance in Consolidated. It closed to-day at 226½ to 227½. Peoples, of Chicago, showed unmistakable strength, and the same remark applies to Baltimore Consolidated. Washington (D. C.) still soars, as witness the quoted prices, 425 to 427½. Buffalo 5's are steadily appreciating in value, and Bay State is "over one." "A. G. T." is informed that no move of the nature inquired about by him is even contemplated.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.
APRIL 7.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	226¾	227½
Central Union, Bonds, 5's	3,000,000	1,000	110	111½
Equitable Bonds, 6's	1,000,000	1,000	105	
" 1st Con. 5's	2,300,000	1,000	115	118
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	315	325
Municipal Bonds	750,000	..	..	
New Amsterdam Gas Co. .. Bonds, 5's	11,000,000	1,000	111½	..
Northern Union, Bonds, 5's.	1,250,000	1,000	106	108
New York and East River.. Bonds 1st 5's	3,500,000	1,000	112	113
" 1st Con. 5's	1,500,000	..	109	111
Richmond Co., S. I.	348,650	50	100	..
" Bonds	400,000	1,000	103	
Standard	5,000,000	100	130	140
Preferred	5,000,000	100	150	160
Bonds, 1st Mortgage, 5's	1,500,000	1,000	118	..
Yonkers	299,650	500	130	
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	226½	227½
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	1	1¼
" Income Bonds	2,000,000	1,000	.	75
Binghamton Gas Works..	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	10	10½
" " Bonds, 5's	5,250,000	1,000	84	84½
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Central San Francisco	2,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104½
Cincinnati Gas & Elec. Co.	29,500,000	100	102½	102¾
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	108	109
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	60	65
Preferred	3,026,500	100	84	86
Consumers, Jersey City Bonds	600,000	1,000	102	103
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	69¼	69½
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's.	1,000,000	..	..	..
Equitable, 1st 6's.	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	13	14
" Con. Mtg. 5's	380,000	1,000	80	81
Consolidated G. & E. Co.'s., Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	.	89
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	382,000	1,000	70	73
" Inc. 5's	16,000	100	94	94½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	34	38
Fort Wayne	2,000,000	..	.	.
" Bonds	2,000,000	..	53	55
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	102	104
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	70	
" Bonds, 6's	2 650,000	..	103	104½
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	89½
Preferred	2,500,000	100	..	110
Bonds	10,000,000	1,000	..	108½
Lafayette Gas Co., Ind.	1,000,000	100		60
Bonds	1,000,000	1,000	57	62
Louisville	2,570,000	50	110	12
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	108½
" 6 per cent. scrip, due 1910	100,000	25	25	87
Montreal, Canada	2,000,000	100	182	184¾
Newark, N. J., Con. Gas Co Bonds, 6's	6,000,000	..	..	55
	4,600,000	..	..	103
New Haven	1,000,000	25	300	325
Nashville Gas Lt. Co.	1,000,000	100	110	..
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	103½	103¾
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	48	48½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's.	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's.	2,465,000	1,000	90	92
St. Joseph Gas Co. " 1st Mtg. 5's	751,000	1,000	95	96½
Syracuse, N. Y.	1,750,000	100	15	17
Bonds	1,612,000	1,000	95½	97½
Washington, D. C	2,600,000	20	425	427½
First mortgage 6's	600,000	..	..	..
Western, Milwaukee. Bonds, 5's	4,000,000	..	109½	110
Wilmington, Del	600,000	50	232	..

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STOCKHOLDERS' MEETING.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, PA., March 1, 1902.

The Annual Meeting of the Stockholders of the United Gas Improvement Company will be held at the office of the Company, northwest corner of BROAD AND ARCH STS., PHILADELPHIA, on Monday, May 5, 1902, at 12 o'clock, noon, for the purposes of electing a President and six Directors, to serve for the ensuing year, considering and acting upon the subject of a proposed increase in the capital stock of the Company from 450,000 shares, of the par value of $50 each, to 565,000 shares, of the par value of $50 each, and transacting such other business as may properly come before the meeting.

The stock transfer books will be closed from 3 P.M., April 29, until 9 A.M., May 6th.

By order of the Board of Directors,

1396-4-e.o.t LEWIS LILLIE, Secretary.

DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, PA., March 12, 1902.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable April 15th, 1902, to stockholders of record at the close of business, March 31, 1902. Checks will be mailed.

1397-5 LEWIS LILLIE, Treasurer.

WANTED,

A Position as Superintendent of a Gas Company,

By an experienced gas engineer, technically educated. Address, "H. F.,"

1400-1 Care this Journal.

WANTED,

POSITION AS MANAGER

Of the commercial and distribution departments of some good gas company that wishes to increase its business on the latest and most progressive lines. Address,

"BUSINESS,"

1400-1 Care this Journal.

Position Desired

By a Young Man as Superintendent of a Small Coal Gas Plant, or Assistant to Superintendent of a Larger Plant.

In present position for last five years. Best of reasons for changing. References exchanged.

1400-1 Address, "C.," care this Journal.

WANTED,

Position as Superintendent of Gas Plant,

By a man with several years' experience, both coal and water gas. Familiar with details connected with manufacturing, distribution and office work. Best of references. Town in the West preferred.

1400-2 Address, "H.," care this Journal.

WANTED,

Situation as Superintendent of Gas Works,

By a man of 35. Thoroughly familiar with coal and water gas. Twelve years' experience. Has had good success in increasing output and getting business. Can furnish good references. Thoroughly practical and familiar with all branches of the business. Address, "N. V. B.,"

1399-tf Care this Journal

WANTED,

Position as General Manager of a Good Sized Gas Company.

East preferred. Sixteen years' continuous service with one company, which having been sold necessitates a change. Very best of references furnished.

1399-2 Address, "X. Y. Z.," care this Journal.

WANTED,

Street Foremen and Caulkers.

A gas company in the vicinity of New York city would like to employ a few main and service foremen and caulkers. Would prefer men familiar with gasfitting and meter work. Can furnish steady work the year around, at good wages, to the right kind of men.

1399-4 Address, "E. H. O.," care this Journal.

Position Wanted.

A YOUNG MAN, age 30, at present employed as superintendent of a gas company, 10 years' practical experience in all branches pertaining to coal or water gas, desires similar position. Locality no object.

Address, "B. W.,"

1399-2 Care this Journal.

Position Desired

By a Practical Gas and Electric Engineer.

In present position for the past 10 years. Good reasons for making change. Fourteen years in the business. Has reconstructed several plants. A practical office man, as well as being competent to lay out extensions and new work that owners of plants may contemplate. References exchanged.

1398-4 Address, "PROGRESSIVE," care this Journal.

WANTED,

Foreman for Gasfitting Department and Shop.

Address, "GAS COMPANY,"

1399-tf Care this Journal.

WANTED,

Foreman of Street Work.

Steady work year around. Address,

1399-tf "FOREMAN," care this Journal.

GAS MAKER

WANTED

For small, modern Lowe gas plant in growing Western town. Must be steady, sober, married man. Good wages, house rent and fuel. Address, stating age and experience,

"H. H. P.,"

1399-2 Care this Journal.

WANTED,

A WET METER,

In first-class operative condition, capable of passing 35,000 to 40,000 cubic feet in 12 hours. Address at once, giving make, age and full description of machine,

NORTH ADAMS GAS LIGHT CO.,

1400-2 NORTH ADAMS, MASS.

WANTED,

Second-Hand Apparatus, as follows:

4 Purifier Boxes, about 8 feet by 8 feet by 2½ feet.
1 Five-foot Station Meter.
1 Set Water Gas Apparatus, 4 feet or 4½ feet.

Send full specifications, plans and price, with date of delivery. Address,

"STANDARD,"

1378-tf Care this Journal.

FOR SALE.

Ironwork for Four Benches of Sixes,

Wilkinson process; mouthpieces, 15 inches by 25 inches; 7-inch wrought iron standpipes; wrought iron hydraulic main. Also, two carburetors. Address,

ESSEX AND HUDSON GAS COMPANY,

1399-2 NEWARK, N. J.

INVENTIONS FOR EUROPE.

Engineers of standing and acquaintance in Europe are desirous of securing the handling of some good inventions abroad. We want such as will justify the organization of companies. Liberal propositions for the right articles.

ZERBE & ZERBE, Engineers,

1345-tf 11 Broadway, New York.

IN THE MARKET.

WE PURCHASE:

Gas properties,
Electric light properties.
Street railway properties.
Also desirable franchises.

W. R. FABEN CONSTRUCTION CO.,
1383-tf 317 St. Claire Street, Toledo, O.

GAS BURNERS,

To burn a given amount at a stated pressure, made to order. Samples furnished. Also, small oil and air valves, slow-feed valves for high pressure, and small brasswork in general.

Drip Pumps, Service Cleaners, Gasfitters' Proving Pumps and Mercury Gauges.

C. GEFRORER & SON,
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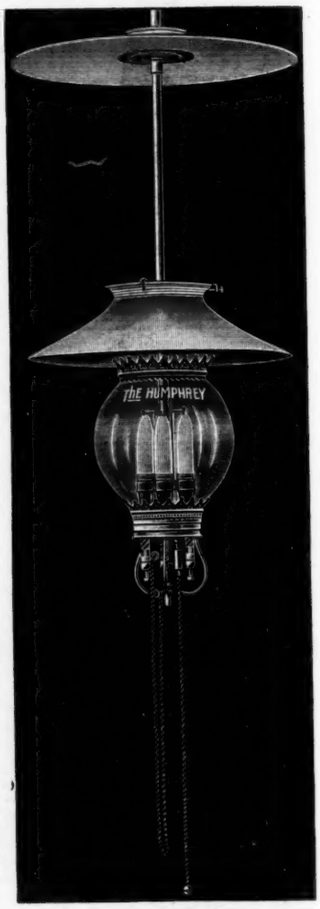

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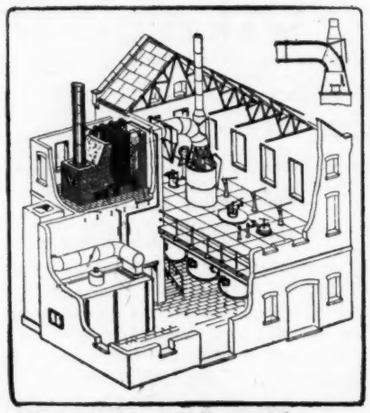

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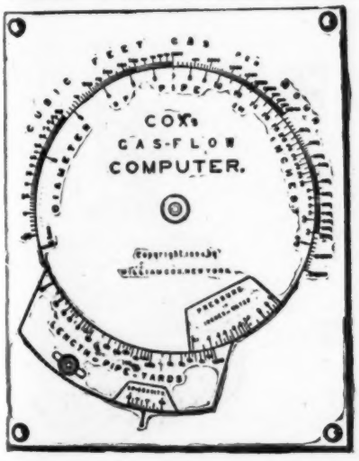

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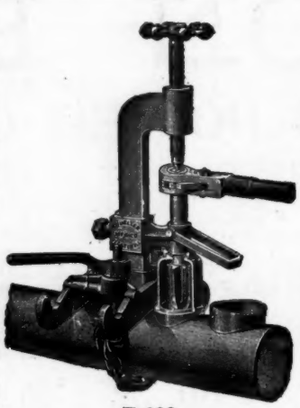

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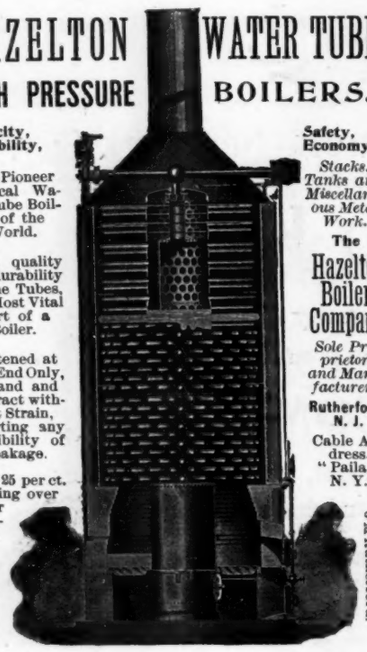

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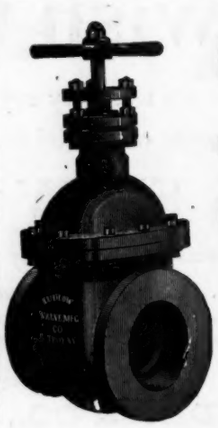

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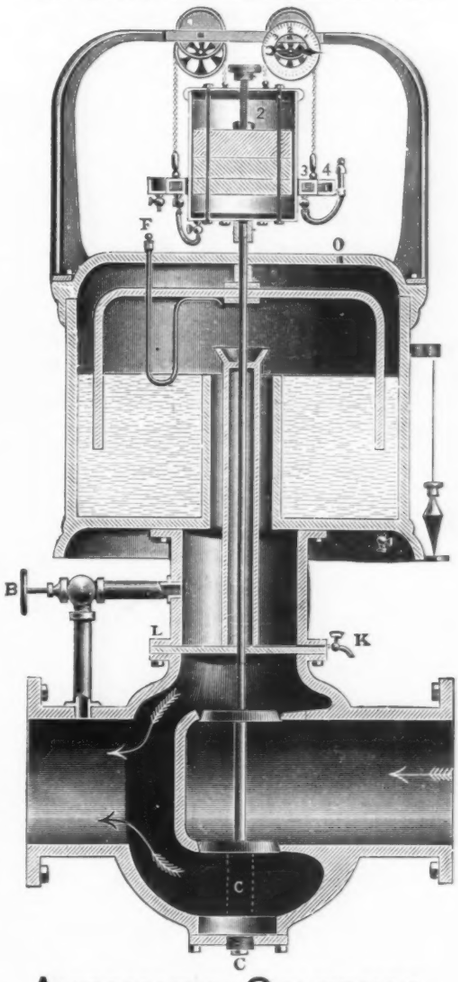

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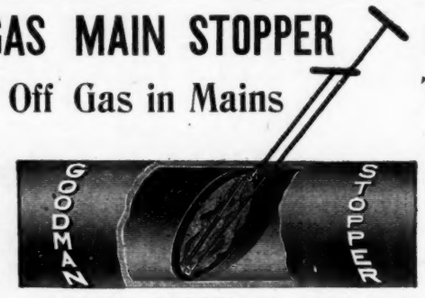

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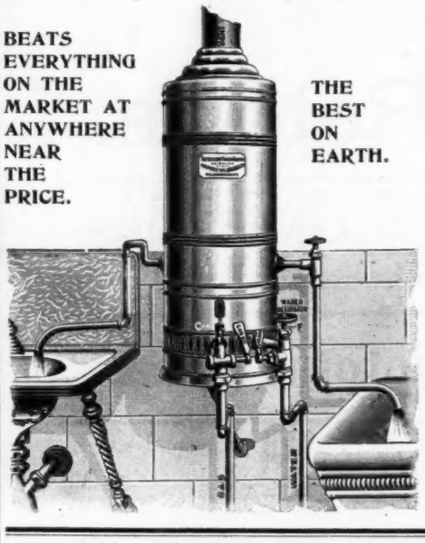

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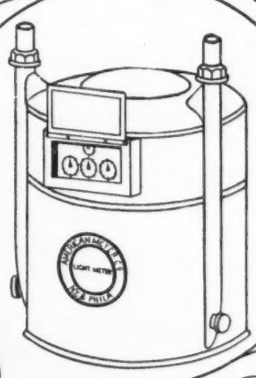

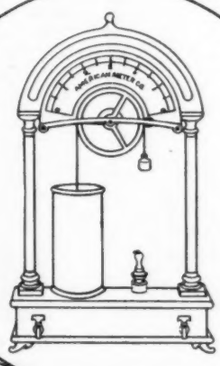

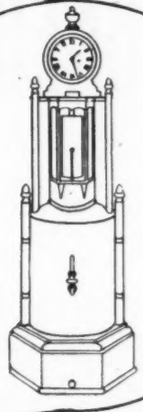

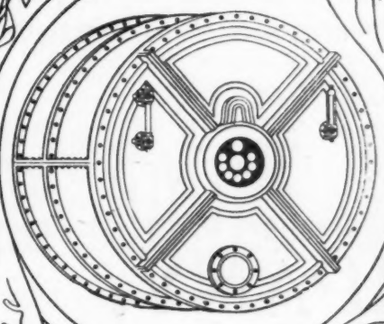

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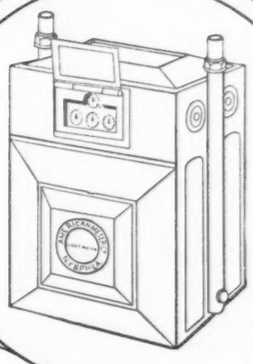
PUBLIC LIGHTING TABLE.

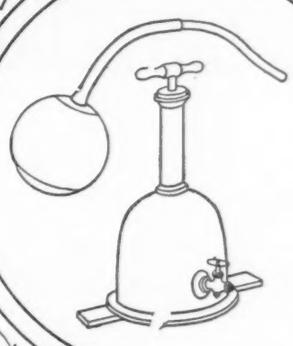
APRIL, 1902.

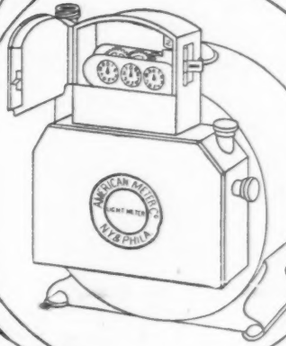
Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. New York City. All Night Lighting. Extinguish.
				P.M.	A.M.
Tue.	1	6.50 PM	2.50 AM	6.10	4.55
Wed.	2	6.50	3.30	6.15	4.40
Thu.	3	6.50	4.10	6.15	4.40
Fri.	4	6.50	4.40	6.15	4.40
Sat.	5	6.50	4.40	6.15	4.40
Sun.	6	7.00	4.30	6.15	4.40
Mon.	7	7.00	4.30	6.15	4.40
Tue.	8	7.00 NM	4.30	6.15	4.40
Wed.	9	7.00	4.30	6.25	4.30
Thu.	10	7.00	4.30	6.25	4.30
Fri.	11	7.00	4.30	6.25	4.30
Sat.	12	7.00	4.30	6.25	4.30
Sun.	13	11.20	4.20	6.25	4.30
Mon.	14	12.10 AM FQ	4.20	6.25	4.30
Tue.	15	12.50	4.20	6.25	4.30
Wed.	16	1.30	4.20	6.30	4.20
Thu.	17	2.00	4.20	6.30	4.20
Fri.	18	2.30	4.20	6.30	4.20
Sat.	19	3.00	4.20	6.30	4.20
Sun.	20	3.30	4.20	6.30	4.20
Mon.	21	No L.	No L.	6.30	4.20
Tue.	22	No L. FM	No L.	6.30	4.20
Wed.	23	No L.	No L.	6.40	4.10
Thu.	24	7.20 PM	9.40 PM	6.40	4.10
Fri.	25	7.20	10.30	6.40	4.10
Sat.	26	7.20	11.20	6.40	4.10
Sun.	27	7.20	12.10 AM	6.40	4.10
Mon.	28	7.20	12.50	6.40	4.10
Tue.	29	7.20	1.30	6.40	4.10
Wed.	30	7.20 LQ	2.00	6.45	4.00

TOTAL HOURS LIGHTING DURING 1902.

By Table No. 1.	Hrs.Min.	By Table No. 2.	Hrs.Min.
January	238.30	January	423.20
February	196.20	February	355.25
March	196.20	March	355.35
April	166.40	April	298.50
May	151.40	May	264.50
June	131.10	June	234.25
July	142.40	July	243.45
August	162.00	August	280.25
September	179.00	September	321.15
October	216.30	October	374.30
November	224.10	November	401.40
December	250.00	December	433.45
Total, yr.	2255.00	Total, yr.	3987.45







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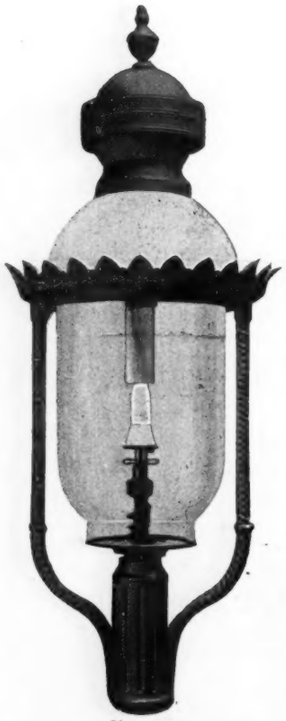

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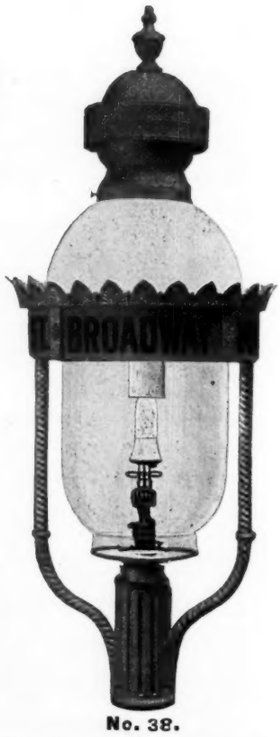

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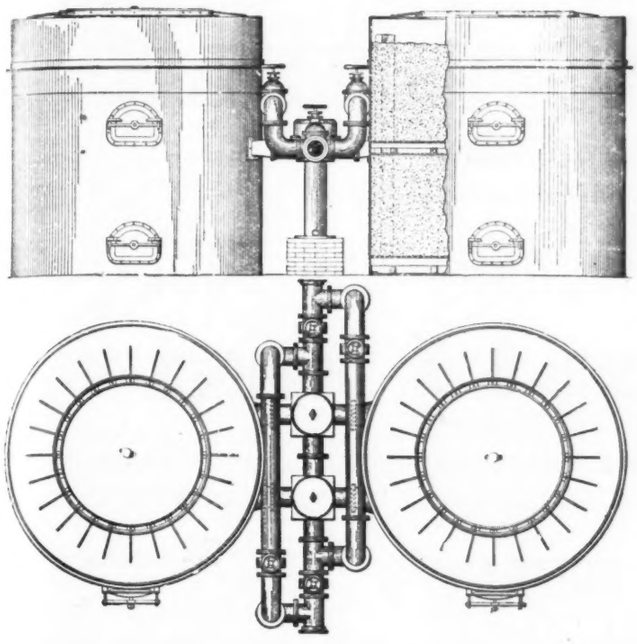

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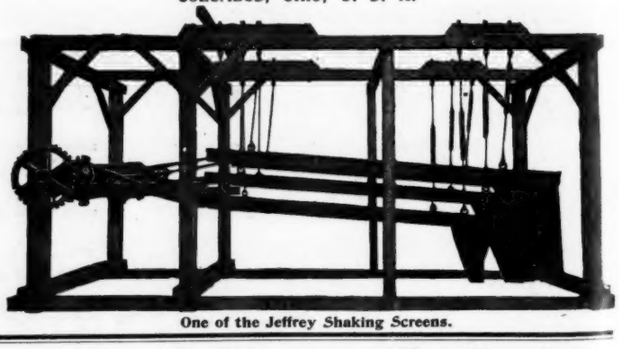
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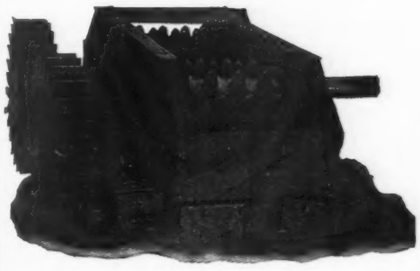

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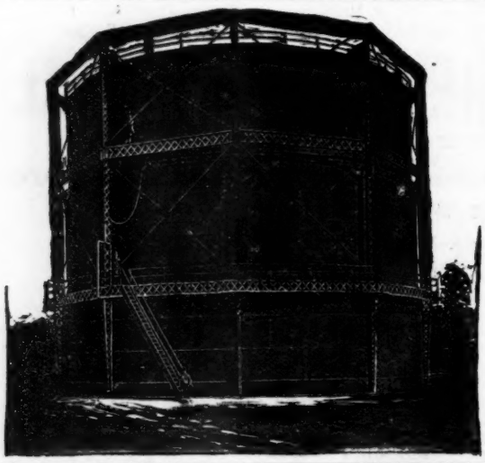

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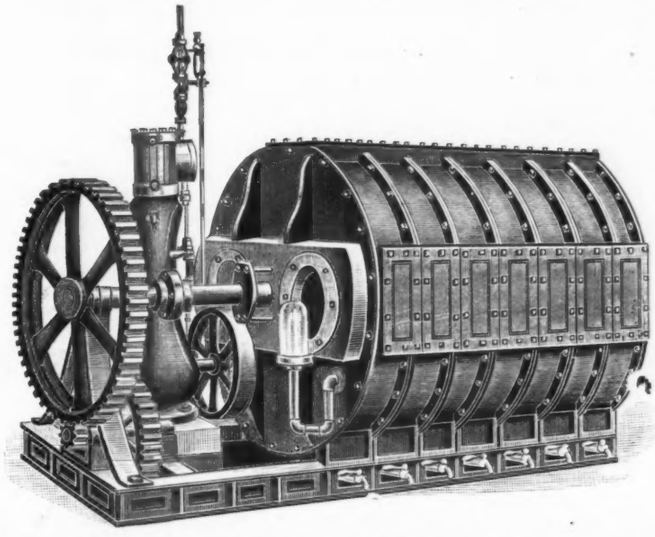

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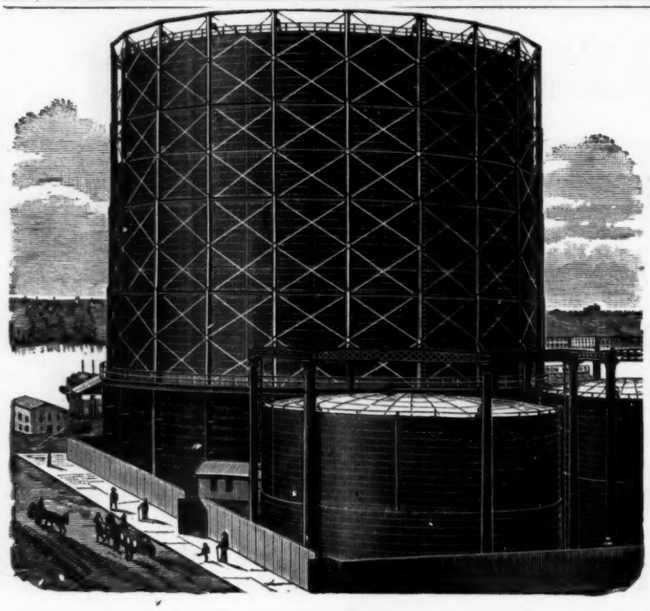

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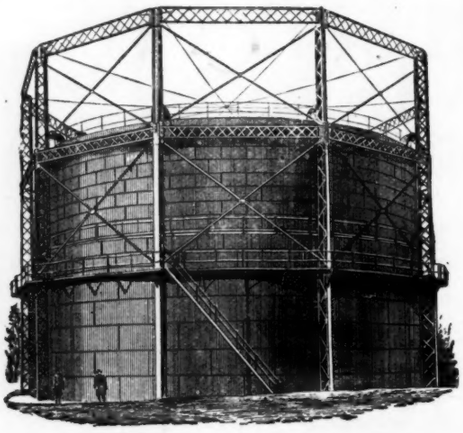

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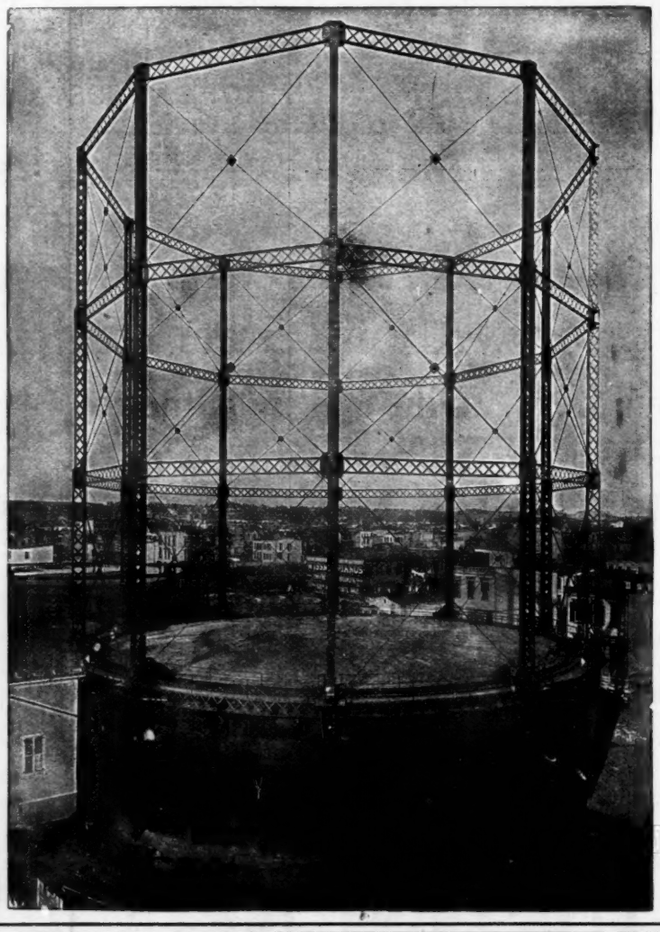

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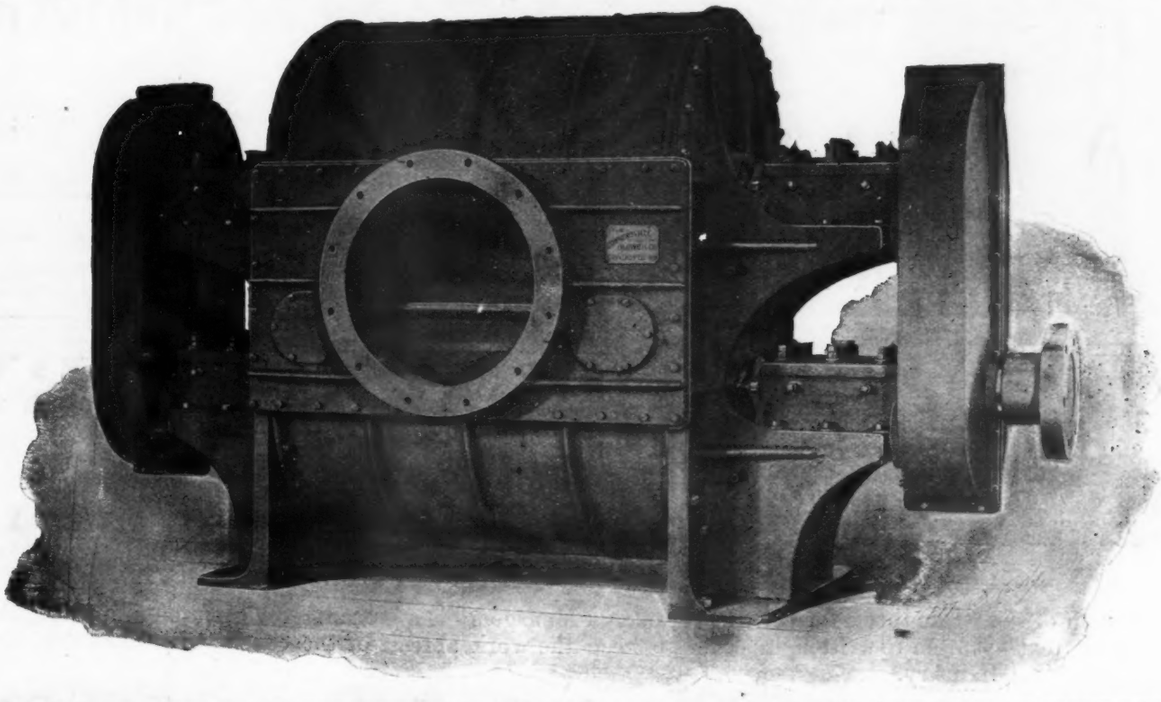

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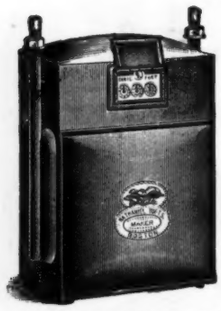

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